

Late Babasaheb Varhade Education Society, Amravati's

**MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND
VITTHALRAO RAUT ARTS COLLEGE,
BHATKULI, DIST. AMRAVATI (M.S.)**



Affiliated to Sant Gadge Baba Amravati University, Amravati (M.S.)

Re-accredited by NAAC with Grade "B"

Website: <https://www.mjfbhatkuli.org/>



NAAC 3rd Cycle

Self Study Report

Supporting Documents

of

Criterion III - Research, Innovations and Extension

3.5.1

The number of MoUs, collaborations/linkages for Faculty exchange, Student exchange, Internship, Field project, On-the- job training, research and other academic activities during the last five years



LATE BABASAHEB VARHADE EDUCATION SOCIETY, AMRAVATI'S
**MAHATMA JYOTIBA FULE COMMERCE, SCIENCE
AND VITTHALRAO RAUT ART'S COLLEGE,
BHATKULI, DIST. AMRAVATI - 444602.**



Accredited by NAAC with 'B' Grade

Web Site: www.mjfbhatkuli.org.in

Email: principal.bhatkuli@gmail.com

Dr. Aakash A. Varhade
President

Dr. K. S. Jamdhade
Principal

Date: 20/05/2023

DECLARATION

This is to declare that the information, reports, true copies, numerical data, etc. furnished in this file as supporting documents is verified by IQAC and found correct.

Hence this certificate.

IQAC Coordinator

Principal

INDEX

Sr. No.	Particulars	Page No.
1	MOU between Department of Chemistry M.J.F.College Bhatkuli and Department of Chemistry, Bhartiya Mahavidyalaya, Amravati. 1. Guest Lecture by Dr. Nilesh Kadu on Transition Elements on 09-06-2022. 2. Guest Lecture by Dr. Niraj N. Gedam on Instrumental and Chemical Analysis of Soil and Water parameters on 18-01-2022.	1 to 6
2	MOU between Department of Botany M.J.F.College Bhatkuli and Department of Botany Indira Gandhi Kala Mahavidyalaya, Ralegaon Dist. Yavatmal 1. One day Webinar on Medicinal Plant Cultivation by Pankaj Manjare.	07 to 11
3	MOU between Department of Botany M.J.F.College Bhatkuli and Department of Botany Lokmanya Tilak Mahavidyalaya, Wani, Dist. Yavatmal; 1. Research collaboration and publication	12 to 24
4	MOU between Department of Zoology M.J.F.College Bhatkuli and Wildlife And Environment Conservation Society, Amravati National Wildlife Week - 2 Oct to 8 Oct - 2021 1. Quiz Competition -04/10/2021 2. Poster Competition -02 to 06 Oct 2021 3. Webinar on "All About Owls" by Dr.Jayant Wadtkar President, Maharashtra Pakshimitra and Honorary Wildlife Warden, Amravati District.-07/10/2021. Prize Distribution - 07/10/2021 1. Wildlife Week (Wildlife Photography Competition) 2 Oct to 8 Oct - 2020 on theme Phylum-Arthropoda. 2. One day National Webinar on 12th July 2020 on Topic "PRIMARY HEALTH CARE AND A REVIEW OF CONTAGIOUS DISEASES IN CONTEXT OF CORONA PANDEMIC	25 to39
5	MOU between Department of Home Economics M.J.F.College Bhatkuli and S.M.T. R. Sarda Arts' Science & Commerce Anjangaon Surji, Dist Amravati, Department Of Home Economics 1) Manvi Vikas Bhag- 1 2) Manvi Vikas Bhag- 2 3) Bal Vikas	40 to 44
	MOU between S.M.T. R. Sarda Arts' Science & Commerce Anjangaon Surji, Dist Amravati, and Department Of Home Economics Department of Home Economics M.J.F.College Bhatkuli . 1) Guest Lecture On Therapeutic Diet , Diliverd By Dr. K. R. Belurkar, Date 21/12/2019 2) Manvi Poshan Aani Ahar Shastra Bhag- 1 3) Manvi Poshan Aani Ahar Shastra Bhag- 2 4) Guest Lecture On Therapeutic Diet , Diliverd By Dr. K. R. Belurkar, Date 17/01/2019 5) Kutumbik Sansadhanache Vyavastapan Aani Gruha Sajavat	45 to 87

development on both campuses. Therefore, Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhakuli & Bharatiya Mahavidyalaya, Amravati, shall encourage interactions between the students and faculty members in support of their mutual interests in the field of education and research.

Based on the principles of mutual benefit and respect for each other's independence, the Department of Chemistry of both the institutions will foster:

- Faculty Exchanges
- Practical and Instrumental Training
- Joint Research Activities
- Student Exchange
- Consultancy and Extension Services
- Exchanges of Academic Materials
- Skill based courses
- Career oriented courses

The two educational institutions will:

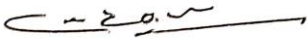
- Co-operate in the exchange of information relating to their activities in teaching and research in fields of mutual interests.
- Have practical and instrumental training at Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhakuli & Bharatiya Mahavidyalaya, Amravati, depending on the nature of work as per rules of the institute, facilities and requirements.
- Joint guidance of student projects in Faculty of Sciences and other research areas of national interest on mutually agreeable terms. Endeavour the visits of students to Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhakuli & Bharatiya Mahavidyalaya, Amravati to provide them with an exposure to various equipments, instruments, and study materials etc.
- Provide Consultancy and Extension Services for the students of above said colleges and work hand in hand for the welfare and betterment of students by guiding and providing various facilities to them.
- Co-operate in short term skill based and career-oriented courses which can be a great way to improve ideas and skills and to provide opportunities to the students therefore the above said college intend to co-operate and focus their efforts and co-operations within such area.


The parties to this MoU undertake to treat as CONFIDENTIAL AND PRIVILEGED information of the other institution, which is so classified in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.

This MoU shall require the ratification of the competent academic/executive body of both the institutions.

1. In order to carry out the above activities, a detailed plan may be agreed to upon consultation between the two institutions.
2. It is implicit that every activity undertaken under this agreement is approved by the appropriate officials at each institution and must fall within each institution's academic and fiscal constraints.

3. This agreement will take effect from the date of its signing and shall be valid initially for 05 years period from that date unless sooner terminated, revoked or modified by mutual written agreement between the Parties, and may be extended by mutual written agreement. However, termination of the MoU will not in any manner affect the interests of the students/faculty/scientists who have been admitted to pursue a programme under the MoU.


Head
Department of Chemistry
Mahatma Jyotiba Fule Commerce, Science
& Vitthalrao Raut Arts College, Bhatkuli



Head
Department of Chemistry
Bharatiya Mahavidyalaya,
Amravati

Authorized Signatory on behalf of Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhatkuli

Date: 23/12/2021

Place: Amravati




Principal
Mahatma Jyotiba Fule Commerce
& Vitthalrao Raut Arts
College, Bhatkuli Dist. Amravati

1st Partner Name : Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhatkuli
Partner representative : Dr. K. S. Jamdhade
Position : Principal
Address : Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati
Telephone : 0721-2389010
E-mail : principal.bhatkuli@gmail.com

Authorized Signatory on behalf of Bharatiya Mahavidyalaya, Amravati

Date: 23/12/2021

Place: Amravati




Principal
Bharatiya Mahavidyalaya
Amravati.

2nd Partner Name : Bharatiya Mahavidyalaya, Amravati
Partner representative : Dr. A. G. Vaidya
Position : Principal
Address : Bharatiya Mahavidyalaya, Rajapeth, Badnera Road, Amravati
Telephone : 0721- 2673283/2575033
E-mail : bmvamt@gmail.com



LATE BABASAHEB VARHADE EDUCATION SOCIETY, AMRAVATI'S
MAHATMA JYOTIBA FULE COMMERCE, SCIENCE
AND VITTHALRAO RAUT ART'S COLLEGE,
BHATKULI, DIST. AMRAVATI - 444602.



Accredited by NAAC with 'B' Grade

Web Site: www.mjfbhatkuli.org.in

Email: principal.bhatkuli@gmail.com

Dr. Aakash A. Varhade
President

Dr. K. S. Jamdhade
Principal

No. MJF/MV/Chc / 07 /2022

Date: 06-09-2022

Certificate

This is to certify that **Mr. Nilesh S. kadu**, Department of Chemistry, Bhartiya Mahavidyalaya, Amaravati Dist. Amaravati, has delivered a Guest Lecture on the topic '**Transition Element**', organized by Department of chemistry on 06th September 2022.

We place on record our deep sense of appreciation and gratitude for having made yourself available as a Resource person for the program. We look forward to your continuous support in the future.

(Dr. K. S. Jamdhade)
Principal

Mahatma Jyotiba Fule Commerce,
Science & Vitthalrao Raut Arts
College, Bhatkuli Dist. Amravati





Bharatiya Vidya Mandir's

**BHARATIYA MAHAVIDYALAYA,
AMRAVATI**

Arts, Commerce, Science & H.S.C. Vocational
(NAAC Re-accredited B++ Grade with CGPA - 2.95)

Dr. Aradhana G. Vaidya

M.A. (Eng.) Ph.D.
Principal

Ref. No.

Date : 18/01/2022

To,

Dr. Niraj Gedam

Assistant Professor & Head,

Department of Chemistry,

Mahatma Jotiba Fule Mahavidyalaya,

Bhatkuli Dist. Amravati

LETTER OF GRATEFULNESS

Dear Sir,

I express my sincere gratitude to you for having graced, as a Resource Person, the Add-on Course on Instrumental and Chemical Analysis of Soil and Water Parameters organized by Department of Chemistry, Bharatiya Mahavidyalaya, Amravati on Tuesday 18 January 2022.

Hope that you would continue to guide and inspire us by your learned association with us in the future.

With sincere regards,

Yours faithfully,

Dr. A. G. Vaidya

Principal

Bharatiya Mahavidyalaya,

Amravati

Address : Rajapeth, Badnera Road, Amravati - 444605

Contact : Off. 2673283, 2575033, Fax. : 0721 - 2566801, Mob.9823030091

E-mail : bmvamt@gmail.com Website : www.bmvamt.ac.in



महाराष्ट्र MAHARASHTRA

© 2021 ©

ZF 716420

११/२६
१८-२५-२०२२

प्राचार्य महात्मा ज्योतिबा फुले
महाविद्यालय - भानुक्का

रसम - विवेक नरसेकर

विजयदत्त एम. साठरकर
मुद्रांक विजेता
सा.क्र. १/१७३-१७/२००१-२
आ.परीक्षर अम



MEMORANDUM
OF
UNDERSTANDING

BETWEEN

MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO
RAUT ARTS COLLEGE, BHATKULI

AND

INDIRA GANDHI-KALA MAHAVIDYALAYA, RALEGAON

INTRODUCTION:

This Memorandum of Understanding is hereby made and entered into by and between Department of Botany, MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT ARTS COLLEGE, BHATKULI, 444602 DIST. AMRAVATI and Department of Botany, INDIRA GANDHI KALA MAHAVIDYALAYA, RALEGAON, 445402 DIST. YAVATMAL; affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 1: Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati established in year 1993 which offers undergraduate courses in Arts, Commerce and Science. The college is accredited with 'B' Grade by NAAC with CGPA 2.36. The college is having qualified staff and experts in various subjects of all the three faculties, i.e. Art, Commerce and Science. The college is affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 2: Indira Gandhi Kala Mahavidyalaya, Ralegaon Dist. Yavatmal established in year 2009 which offers undergraduate courses in Arts and Science. The college is accredited with 'B' Grade by NAAC with CGPA 2.03. The college is having qualified staff and experts in various subjects such as Botany, Zoology, Chemistry, Physics, Mathematics. The college is affiliated to Sant Gadge Baba Amravati University, Amravati.

PURPOSE:

The propose of this Memorandum of Understanding is to continue and expand a framework of co-operation between Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602 and Department of Botany, Indira Gandhi Kala Mahavidyalaya, Ralegaon Dist. Yavatmal 445402 to develop mutually beneficial programs, projects and activities.

OBJECTIVES:

Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602 and Department of Botany, Indira Gandhi Kala Mahavidyalaya, Ralegaon Dist. Yavatmal 445402 have mutually agreed to co-operate with each other in following areas.

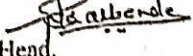
1. To arrange collaborative Career Guidance and Counseling programs in the field of Science and Technology.
2. To organize extension activities for the benefit of local committees.
3. To organize the Guest Lectures series for the students and faculty members on the topic of mutual benefits.
4. To organize collaborative Workshops/Conferences/Symposia.
5. Strengthening of teaching and learning process by exchange of faculty.

6. To provide platform for collaborative research activities.
7. To organize jointly professional and administrative training programs for non-teaching and supporting staff.

TERMS AND CONDITIONS:

- The details for the efficacious implementation of this Memorandum of Understanding shall be jointly worked out on mutually acceptable terms within the parameters of the policies, rules and regulations of both the institutions.
- The parties to this memorandum may, by mutual consent, add, modify, amend, delete, review or revise any term (s) and condition (s) of this agreement.
- The parties to this Memorandum of Understanding undertake to treat as CONFIDENTIAL AND PRIVILEGED information of the other institution, which is so classified in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.
- This Memorandum of Understanding shall require the rectification of the competent academic or executive body of both the institution.
- Either parties can terminate the Memorandum of Understanding after giving one month's notice to the other party subject to fulfillment of commitments already agreed upon.
- The Memorandum of Understanding shall be reviewed at the end of every academic year.
- Any dispute arising out of this Memorandum of Understanding will be settled by mutual negotiations between the two parties.
- There will be no financial liabilities and obligations for both the organizations.
- Both the organizations will appoint a person to serve as the official contact and co-ordinate the activities of each organization in carrying out this Memorandum of Understanding.

The appointees of each organization are

- a) Dr. S. P. Kalbende 
Assistant Professor and Head,
Department of Botany,
M.J.F. Com., Sci. and V.R. Arts College, Bhatkuli
Mob. No.: +91 9595161899 Email Id: kalbendeswapna@gmail.com

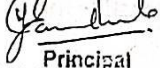
b) Mr. V.D. Samarth

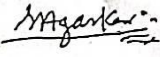
Assistant professor and Head, Dept. of Botany, I.G.K.M. Ralegaon
Mobile No.: 7057065041, e-mail:- vd_samarth@gmail.com

- The Memorandum of Understanding will remain valid for the period of 5 years on the date it is signed by the parties.

Signed at Ralegaon on this day of 21 02 / 2022 2022.

Authorized signatory on behalf of Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli. Authorized signatory on behalf of Indira Gandhi Kala Mahavidyalaya, Ralegaon

Signature: 
Principal
Name: Dr. K. S. Jambhade
Seal: Mahatma Jyotiba Fule Commerce, Science & Vitthalrao Raut Arts College, Bhatkuli Dist. Amravati

Signature: 
Name: Dr. Santosh V. Agarkar
Seal: PRINCIPAL
Indira Gandhi Kala Mahavidyalaya, Ralegaon Dist. Yavatmal





Date:
Email Id: principal.bhatkuli@gmail.com
Website: <https://mjfbhatkuli.org/>

Date:
Email ID.: santoshagarkar@gmail.com
igkm490@gmail.com

Mob. No.: +91 9921559789

Website: igkmralegaon.org
Mob. No.: 9373778210

WITNESSES:

S.N.	Name	Organization	Designation	Signature
1.	Dr. V. R. Narkhedkar	Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli.	Assistant Professor	
2.	Mr. N. M. Deshmukh	Indira Gandhi Kala Mahavidyalaya, Ralegaon	Assistant Professor	

देशोन्नती

**‘औषधी वनस्पती लागवड’ विषयावर
ऑनलाईन संवाद कार्यक्रम**

देशोन्नती वृत्तसंकलन...

राजेगाव ■ वनस्पतीशास्त्र विभाग व आय.एच.ए.सी., इंदिरा गांधी कला महाविद्यालय राजेगाव व महात्मा ज्योतिबा फुले वाणिज्य, विज्ञान व विदुलराव राजत कला महाविद्यालय, मातकुली यांच्या संयुक्त विद्यमाने आमांसी पद्धतीने संवाद कार्यक्रमाचे आयोजन करण्यात आले होते. यामध्ये ‘औषधी वनस्पती

सांगवड’ या विषयावर कार्यक्रमाचे मुख्य वक्ते पंकज मानरे, मुख्य कार्यकारी अधिकारी व संस्थापक, पीएमसी हर्बल आणि आयुर्वेद, सॉलिसिंस यानी शतावरी, कोरफड, अक्षयगाथा, ब्राम्ही ड. औषधी वनस्पती लागवडीबाबत सखोल माहिती दिली. या कार्यशाळेला अध्यक्ष म्हणून महात्मा ज्योतिबा फुले वाणिज्य, विज्ञान व विदुलराव राजत कला महाविद्यालय, मातकुली महाविद्यालयाचे प्रचार्य डॉ. के.एस. जमगाडे उपस्थित होते. कार्यक्रमाचे संचालन प्रा. शेठे, आचार्य प्रदर्शन डॉ. एस.पी. काळवंडे यानी केले. प्रचार्य डॉ. एस. वि. आगरकर यांनी कार्यक्रमाला मार्गदर्शन तसेच शुभेच्छा दिल्या या कार्यक्रमाला व्ही. डी. समर्थ, डॉ. वि. आर. नरखेडकर, एन.एम. देशमुख, एम. डी. वानखडे, यांचे सहकार्य लाभले. या कार्यक्रमाला विद्यार्थी, शेतकऱ्यांनी आपला सहभाग नोंदविला. (ता.प्र.)

Deshnata Edition
May 9, 2022 Page No. 5
Powered by - ebn1616.com

नवभारत

कार्यक्रम मातकुली के ज्योतिबा फुले कालेज में किया गया आयोजन

‘औषधीय पौधों की खेती’ पर हुआ संवाद

दी अनुबंध खेती की जानकारी

कार्यक्रम में प्रथम क्षेत्र में औषधी वनस्पती खेती के लिए प्रस्ताव अंतरराज्यीय जानकारी प्राप्त करने के लिए प्रस्ताव आने, मुख्य कार्यकारी अधिकारी व संस्थापक, पीएमसी हर्बल व एच.ए.सी., इंदिरा गांधी कला महाविद्यालय राजेगाव व महात्मा ज्योतिबा फुले वाणिज्य, विज्ञान व विदुलराव राजत कला महाविद्यालय, मातकुली यांच्या संयुक्त विद्यमाने आमांसी पद्धतीने संवाद कार्यक्रमाचे आयोजन करण्यात आले होते. यामध्ये ‘औषधी वनस्पती

मातकुली (रा.) येथे झालेले कार्यक्रमाचे मुख्य वक्ते पंकज मानरे, मुख्य कार्यकारी अधिकारी व संस्थापक, पीएमसी हर्बल आणि आयुर्वेद, सॉलिसिंस यानी शतावरी, कोरफड, अक्षयगाथा, ब्राम्ही ड. औषधी वनस्पती लागवडीबाबत सखोल माहिती दिली. या कार्यशाळेला अध्यक्ष म्हणून महात्मा ज्योतिबा फुले वाणिज्य, विज्ञान व विदुलराव राजत कला महाविद्यालय, मातकुली महाविद्यालयाचे प्रचार्य डॉ. के.एस. जमगाडे उपस्थित होते. कार्यक्रमाचे संचालन प्रा. शेठे, आचार्य प्रदर्शन डॉ. एस.पी. काळवंडे यानी केले. प्रचार्य डॉ. एस. वि. आगरकर यांनी कार्यक्रमाला मार्गदर्शन तसेच शुभेच्छा दिल्या या कार्यक्रमाला व्ही. डी. समर्थ, डॉ. वि. आर. नरखेडकर, एन.एम. देशमुख, एम. डी. वानखडे, यांचे सहकार्य लाभले. या कार्यक्रमाला विद्यार्थी, शेतकऱ्यांनी आपला सहभाग नोंदविला. (ता.प्र.)

All-India Edition
10-May-2022 Page No. 2
epaper.enovabharat.com



Late Babasaheb Varhade Education Society, Amravati's
Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut
Art's College, Bhatkuli, Dist. Amravati - 444602 (M.S.), India.
(Re-accredited by NAAC with 'B' grade)

ONE DAY WEBINAR
05th May, 2022 at 11:00 am

MEDICINAL PLANT CULTIVATION

Organized by
Department of Botany and IQAC
Mahatma Jyotiba Fule Commerce, Science. and Vitthalrao Raut
Art's College, Bhatkuli, Dist. Amravati
in collaboration with
Indira Gandhi Kala Mahavidyalaya, Ralegaon, Dist. Yavatmal.

Registration Link: <https://forms.gle/8DrA92hgzGKTaUep9> OR Scan



Shri. Pankaj Manjare
CEO and Founder
PMP Herbal and Agro Services





LATE BABASAHEB VARHADE EDUCATION SOCIETY, AMRAVATI'S
**MAHATMA JYOTIBA FULE COMMERCE, SCIENCE
 AND VITTHALRAO RAUT ART'S COLLEGE,**
 BHATKULI, DIST. AMRAVATI - 444602.



Accredited by NAAC with 'B' Grade

Web Site: www.mfshatkuli.org.in

Email: principal@mfshatkuli.org.in

Dr. Aakash A. Varhade
 President

Dr. K. S. Jamdhade
 Principal

MEMORANDUM
 OF
 UNDERSTANDING

BETWEEN

MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO
 RAUT ARTS COLLEGE, BHATKULI
 AND
 LOKMANYA TILAK MAHAVIDYALAYA, WANI

INTRODUCTION:

This Memorandum of Understanding is hereby made and entered into by and between Department of Botany, MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT ARTS COLLEGE, BHATKULI, 444602 DIST. AMRAVATI and Department of Botany, LOKMANYA TILAK MAHAVIDYALAYA, WANI affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 1: Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati established in year 1993 which offers undergraduate courses in Arts, Commerce and Science. The college is accredited with 'B' Grade by NAAC with CGPA 2.36. The college is having qualified staff and experts in various subjects of all the three faculties, i.e. Art, Commerce and Science. The college is affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 2: Lokmanya Tilak Mahavidyalaya, Wani, Dist. Yavatmal is one of the premier educational institutes of Yavatmal district, Maharashtra (India) established by Shikshan Prasarak Mandal, Wani in July 1961. Initially, it was a single faculty Arts college in its year of foundation which over the years blossomed into a

14

multifaculty educational institute running the programs in Arts, Commerce & Science +2 levels, B.A., B. Com., B.Sc., at Graduate level, M.A.(Marathi, English, History, Economics, Sociology & Pol.Sci.), M.Com, M.Sc. (Chemistry, Botany & Computer Science) at Post Graduate Level, along with Ph.D. programs in Marathi, English, Sanskrit, Sociology, Economics, Chemistry, Botany and Zoology. The college is accredited with 'B' Grade by NAAC with CGPA 2.12. The college is having qualified staff and experts in various subjects of all the three faculties, i.e. Art, Commerce and Science. The college is affiliated to Sant Gadge Baba Amravati University, Amravati.

PURPOSE:

The propose of this Memorandum of Understanding is to continue and expand a framework of co-operation between Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602 and Department of Botany, Lokmanya Tilak Mahavidyalaya, Wani, Dist. Yavatmal 445304 to develop mutually beneficial programs, projects and activities.

OBJECTIVES:

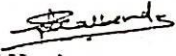
Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602 and Department of Botany, Lokmanya Tilak Mahavidyalaya, Wani, Dist. Yavatmal 445304 have mutually agreed to co-operate with each other in following areas.

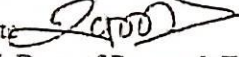
1. To provide platform for collaborative research activities.
2. To arrange collaborative Career Guidance and Counseling programs in the field of Science and Technology.
3. To organize extension activities for the benefit of local committees.
4. To organize the Guest Lectures series for the students and faculty members on the topic of mutual benefits.
5. To organize collaborative Workshops/Conferences/Symposia.
6. Strengthening of teaching and learning process by exchange of faculty.
7. To organize jointly professional and administrative training programs for non-teaching and supporting staff.

TERMS AND CONDITIONS:

- The details for the efficacious implementation of this Memorandum of Understanding shall be jointly worked out on mutually acceptable terms within the parameters of the policies, rules and regulations of both the institutions.
- The parties to this memorandum may, by mutual consent, adds, modify, amend, delete, review or revise any term (s) and condition (s) of this agreement.
- The parties to this Memorandum of Understanding undertake to treat as CONFIDENTIAL AND PRIVILEGED information of the other institution, which is so classified in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.
- This Memorandum of Understanding shall require the rectification of the competent academic or executive body of both the institution.
- Either party can terminate the Memorandum of Understanding after giving one month's notice to the other party subject to fulfillment of commitments already agreed upon.
- The Memorandum of Understanding shall be reviewed at the end of every academic year.
- Any dispute arising out of this Memorandum of Understanding will be settled by mutual negotiations between the two parties.
- There will be no financial liabilities and obligations for both the organizations.
- Both the organizations will appoint a person to serve as the official contact and co-ordinate the activities of each organization in carrying out this Memorandum of Understanding.

The appointees of each organization are

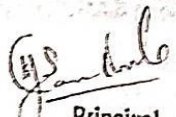

a) Dr. S. P. Kalbende 
 Assistant Professor and Head,
 Department of Botany,
 M.J.F. Com., Sci. and V.R. Arts College, Bhatkuli
 Mob. No.: +91 9595161899 Email Id: kalbendeswapna@gmail.com

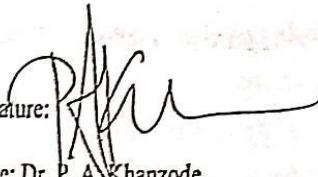

b) Prof. Dr. R. S. Mante 
 Professor and Head, Dept. of Botany, L.T.M., Wani
 Mobile No.: 9823491707, e-mail: ravindramattewani@gmail.com

- The Memorandum of Understanding will remain valid for the period of 5 years on the date it is signed by the parties.

Signed at Wani on this the day of 12/10/2021

Authorized signatory on behalf of Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli. Authorized signatory on behalf of Lokmanya Tilak Mahavidyalaya, Wani.

Signature: 
Principal
Name: Dahana Jyotiba Fule
Principal, Commerce,
Science and Vitthalrao Raut Arts
College, Bhatkuli Dist. Amravati
Seal: 

Signature: 
Name: Dr. P. A. Khanzode
Principal
Seal: 



Date:
Email Id: principal.bhatkuli@gmail.com
Website: <https://mjfbhatkuli.org/>

Mob. No.: +91 9921559789

Date:
Email ID.: principal@ltmwani.org
Website: <http://ltmwani.org/>

Mob. No.: +91 9422778689

WITNESSES:

S.N.	Name	Organization	Designation	Signature
1.	Dr. V. R. Narkhedkar	Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli.	Assistant Professor	
2.	Dr. A. V. Rajurkar	Lokmanya Tilak Mahavidyalaya, Wani.	Assistant Professor	

Annexure III

Terms and conditions

- Admitted students will be eligible for training and other benefits.
- The fees schedule will be as per the decision of Wild life and Environment Conservation Society in consultation with the Mahatma Jyotiba Fule Commerce, Science and V.R. Arts College, Bhatkuli Dist. Amravati.
- The institute will provide the resource required.
- Certification will be provided by the institution and WECS
- The activities will be conducted in Wild life and Environment Conservation Society (WECS) and in an Institution.
- Life membership of WECS is compulsory for Institute.
- MOU will remain valid for next ten years.
- Institutional membership of WECS is mandatory



Principal
 Mahatma Jyotiba Fule Commerce,
 Science & Vithaldas Raut Arts
 College, Bhatkuli Dist. Amravati
 Mahatma Jyotiba Fule
 Commerce, Science And
 V. R. Arts College,
 Bhatkuli, Dist. Amravati

Secretary

WECS, Amravati

In the Presence of witnesses

1. _____
2. _____
3. _____



Diversity Assessment in Some *Cassia* Species Based on Pollen Morphological Characters from Vidarbha Region of Maharashtra, India

Ajay V. Rajurkar¹ and Vivek R. Narkhedkar*²

¹Lokmanya Tilak Mahavidyalaya, Wani, Dist. Yavatmal – 445304 (M.S.), India

²Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Art's College, Bhatkuli, Amravati – 444602 (M.S.), India

Abstract

The inert nature of pollen characters towards strong selective forces favored its utility as a taxonomic tool. The present work assessed the diversity among the selected species of *Cassia* using pollen morphological characters. Pollen morphology of ten *Cassia* species was studied by Scanning Electron Microscope and Light. A total of 23 pollen morphological characters were observed. All the species showed distinct variations in terms of shape, size, aperture, and exine ornamentation characters. In all ten *Cassia* species, a major similarity in aperture type was observed having tricolporate to trizonocolporate. Size ranges between 23-40 μm , while, shapes were oblate, spheroidal-prolate, spheroidal. Psilate or psilate perforate, reticulate, or microreticulate tectum was noted in SEM observation.

Keywords: *Cassia*, *Caesalpinioaceae*, LM, Pollen morphology, SEM.

Introduction

The genus *Cassia* L. is widely distributed and consists of about 500 to 600 species (Airy-Shaw 1973; Singh 2001). It is probably the largest of the leguminous genera in the sub-family Caesalpinioideae. The genus *Cassia* is categorized among the 25 largest genera of the dicotyledonous plants (Irwin & Turner, 1960). *Cassia* L. has been recognized as a heterogeneous group. The taxonomy and nomenclature of *Cassia* L. species are quite complex and intriguing. Bentham (1871) divided the genus *Cassia* into three genera and nine sections. Britton & Rose (1930) split the genus *Cassia* into twenty-eight genera. Irwin and Baneby (1982) realizing diversity and complexity raised the genus *Cassia* L. to the levels of subtribe (Cassiinae) and raised the sub-genera *Senna* Mill. and *Chamaecrista* Moench to genetic level. Currently, this genus has followed several probing lines of classification, because of the extreme morphological resemblances and ambiguous boundaries between taxa (Soladoye *et al.*, 2010). This unstable taxonomic boundary is

mainly due to difficulty in the taxonomic identification and interpretation of similar morphological features in the genus *Cassia*. Marazzi *et al.*, (2006) noted that the high degree of specialization typical of the buzz-pollinated *Cassia* flowers complicates the identification of characters that can be unambiguously used for their taxonomic identification and delineation.

The advances in micro-diagnostic techniques endorsed palynology as a significant field of study. Different features of pollen external surface such as apertural pattern, exine pattern, shape, and symmetry are very conventional for the taxonomic judgment of the plants (Perveen, 2006; Bera *et al.*, 2007; Keshavarzi *et al.*, 2012). The external surface features of pollen are often overlooked by many taxonomists due to the fact that they are so small (ca. 0.3 μm in diameter) for their identification (Faegri *et al.*, 1989), and hence microscopic (both electron and light) techniques are prerequisite tools for

*Corresponding Author:

Vivek R. Narkhedkar;

DOI: <http://dx.doi.org/10.21746/aps.2022.11.01.14>

Page | 4662

discrimination among the plant species. The importance of pollen features in the discrimination of different taxon and the significance in evaluating the systematic position of some species of the Leguminosae including the genus *Cassia* has been provided by many authors such as Erdtman (1952); Nair and Sharma (1962); El Ghazali (1989); Jumah (1991-1996) & Aftab and Perveen (2006). Labouriau *et al.*, (1965) studied the pollen variation of polar axis and equatorial diameters in two species of *Cassia* viz., *C. cathartica* and *C. rugosa*. Wherein, magnitude of polar axis was reported to be more than the equatorial axis. Singh (2001) in a monograph on Indian sub-tribe Cassiinae, pinpointed the variations in ectine surface that may be used as a base for delimiting certain related taxa. Recently, Abdalla (2014) made an attempt to elucidate the taxonomical relation between seven *Cassia* sp. from Sudan using pollen surface features as a reference diagnostic character.

The high level of magnification for the evaluation of pollen features was achieved by the electron microscope. The present investigation assessed the diversity among available species of *Cassia* based on pollen morphology evaluation using Scanning Electron Microscopy (SEM) and Light Microscopy (LM).

Materials and Methods

The pollen grains from ten genera of *Cassia* (Table 1) was collected from the campus of Sant Gadge Baba Amravati University, Amravati (Maharashtra), and stored in 70% alcohol. The studied taxa were identified from Floras (Naik, 1998 and Yadav, 2005). The collected material was crushed with a glass rod in a plastic centrifuge tube and crushed material was filtered through fine meshes to isolate pollen grains. The methods described by Erdtman (1960) and Arora & Modi (2008) were utilized for the preparation of pollen and subsequent analysis by electron and light microscopy. Pollen grains mounted in glycerin jelly were taken for observations by Carl Zeiss's Trinocular Fluorescence Microscope (Axiostar HBO 50/AC). For

Scanning Electron Microscopy (SEM) studies, pollen grains were suspended in a drop of ethanol and directly transpired with a fine pipette to a metallic stub using double-sided cello tape and coated with gold-palladium in a sputtering chamber (POLARON SPUTTER COATER). The SEM examination was carried out on a LEO electron microscope (LEO 430). The measurements are based on data from 10 pollen collected by an ocular micrometer. For the diversity assessment, pollen grain size, colpi size, pore size was measured (Table 1). The terminology used is in accordance with Faegri and Iverson (1964), Erdtman (1971), Bhattacharya *et al.*, (2006), Agashe (2006), and Punt *et al.*, (2007). A total of 23 features of *Cassia* sp. were observed separately for morphological analysis.

Results

Description of pollen morphological characters:

Cassia alata L.

Pollen grain features showed Polar Axis (PA) 31.30-32 μm , Equatorial Axis (EA) 28-30 μm , radially symmetrical, prolate spheroidal, polar outline triangular obtuse, equatorial outline elliptic, trizonocolporate, colpi 19.19 μm long and 4.5-5 μm wide, colpi tapering towards the end, separated into two by ori, mesocolpium 18.1-19.21 μm , apocolpium 5.51-6.66 μm , pori circular, 5.5-6.6 μm in diameter, exine 1.65-2.0 μm , tectum psilate [Fig. 1 (LM, Polar View (PV)), Fig. 2 (SEM, PV, Mag. 2.23 KX) Table 1].

Cassia auriculata L.

Pollen grain PA 25.2 (26.04) 27 μm , EA 29.97(34.86) 36.52, radially asymmetrical, prolate spheroidal-sub-prolate, polar outline triangular-obtuse, equatorial outline rhombic acuminate obtuse, trizonocolporate, colpi 26.56 μm long and 3.99 μm wide at equator, colpi broad, sides parallel with rounded ends, pori 2.66-3.16 μm in diameter, mesocolpi 23.56-26.09 μm , exine 1.76-2.40 μm thick, tectum fossulate-rugulate or rarely coarsely reticulate [Fig. 3-4 (LM, PV and Equatorial View (EV)), Fig. 5 (SEM, EV, Mag. 4.31 KX) Table 1].

***Cassia bicapsularis* L.**

Pollen grain PA 23.97 μm , EA 27.66 μm , radially symmetrical, suboblate-oblate spheroidal, polar outline triangular, equatorial outline elliptic, trizonocolporate, colpi 21.20 μm long and 3.22-3.68 μm wide, mesocolpium 18.90 μm , apocolpium 8.75 μm , pori circular, 2.30 μm wide, colpi linear to narrowly elliptic, tips obtuse, exine 1.93-2.44 μm thick, tectum microreticulate perforate, N3P4C5 [Fig. 6-7 (LM, PV and EV), Fig. 8-9 (SEM, PV and EV, Mag. 4.03 KX and 5.40 KX) Table 1].

***Cassia biflora* L.**

Pollen grains, PA 23.43-25 μm , EA 26.98-32.66 μm , radially symmetrical, sub-oblate, Polar Outline triangular, equatorial outline elliptic, trizonocolporate, colpi 22.72 μm long and 2.84-3.55 μm wide, colpi narrowly elliptic, mesocolpium 15.2 μm , apocolpium 6-6.8 μm , pori circular, 3.55 μm in diameter, exine 1.47-2.31 μm thick, tectum psilate to perforate N3P4C5 [Fig. 10(LM, EV), Fig. 11 (SEM, EV, Mag. 1.38 KX) Table 1].

***Cassia fistula* L.**

Pollen grain PA 34.86-36.92 μm , EA 32.69-33.43 μm , radially symmetrical, prolate spheroidal, polar outline triangular, equatorial outline elliptic, tricolporate, colpi linear to narrowly elliptic, tips acute, colpi faint, 22.5-24.57 μm long and 5.6-5.76 μm wide, pori 3.22-3.72 μm wide, mesocolpi 26.8-28.55 μm , apocolpi 15.7-18.3 μm , exine 1.86-2.40 μm thick, punctitegillate or tectum microreticulate perforate, N3P4C5 [Fig. 12(LM, PV), Fig.13 (SEM, PV, Mag. 5.46 KX) Table 1].

***Cassia javanica* L.**

Pollen grain PA 24.32- 26.86 μm , EA 36.8-37.2 μm , radially symmetrical, oblate-sub-oblate, polar outline triangular, equatorial outline elliptic, tricolporate, colpi narrowly elliptic, 30-32 μm long and 5.28-5.77 μm wide, pori circular, mesocolpi 19.96-21.83 μm , apocolpi 12.76-13.69 μm , exine 2.24-3.17 μm in thickness, tectum psilate- microreticulate perforate, N3P4C5 [Fig. 14-15 (LM, PV and EV), Fig. 16 (SEM, EV, Mag. 3.58 KX) Table 1].

***Cassia occidentalis* L.**

Pollen grains, PA 32.92 μm , EA 37.63 μm , radially symmetrical, sub-oblate-oblate spheroidal, polar outline triangular, equatorial outline elliptic, trizonocolporate, colpi 29.52-38 μm long and 3.52-4.70 μm wide, colpi narrowly elliptic, tips acute, mesocolpium 27.04 μm , apocolpium 8.82-9.40 μm , pori circular, 4.70 μm in diameter, exine 1.77-2.62 μm in thickness, tectum finely reticulate, N3P4C5 [Fig. 17-18(LM, PV and EV), Fig. 19-20 (SEM, PV and EV, Mag. 1.14 KX and Mag. 1.14 KX) Table 1].

***Cassia obtusifolia* L.**

Pollen grain PA 36.45-38.80 μm , EA 41.16-42.84 μm , radially symmetrical, oblate spheroidal, polar outline triangular obtuse, equatorial outline elliptic, trizonocolporate, colpi 34.10 μm long and 3.52-4.70 μm wide, colpi narrowly elliptic, separated into two by a bridge formed over ori, tips acute, ori circular-elliptic, 5.88 μm wide, mesocolpium 31.75-32.92 μm , apocolpium 13.52-15.87 μm , exine 2.08-2.31 μm thick, tectum microreticulate perforate, N3P4C5 [Fig. 21-22(LM, PV and EV), Fig. 23-24 (SEM, PV and EV, Mag. 1.21 KX and Mag. 1.21 KX) Table 1].

***Cassia siamea* Lam.**

Pollen grains, PA 33.32-34.15 μm , EA 35.11-37.48 μm , radially symmetrical, oblate-spheroidal, polar outline triangular obtuse, equatorial outline elliptic, trizonocolporate, colpi 28.99-30.82 μm long and 6.8 μm wide, colpi tapering towards the end, separated into two by pori, mesocolpium 26.4-28.4 μm , apocolpium 6-7.2 μm , pori circular, 5.8-6.4 μm in diameter, exine 2.73-3.30 μm in thickness, tectum psilate to perforate, N3P4C5 [Fig. 25-26 (LM, PV and EV), Fig. 27-28 (SEM, PV and EV, Mag. 3.27 KX and Mag. 3.27 KX) Table 1].

***Cassia tora* L.**

Pollen grain PA 29-30 μm , EA 34-36 μm , radially symmetrical, prolate spheroidal-Sub-prolate, polar outline triangular obtuse, equatorial outline elliptic, trizonocolporate, Colpi linear to narrowly elliptic, colpi 27-29 μm long and 4.59-5.35 μm wide, mesocolpium 25.24 μm , apocolpium 8.41-9.18 μm , pori

circular, 3-5 μm wide, exine 1.44-2.04 μm thick, tectum psilate- verrucate, heterobrochate, N3P4C5 [Fig. 29-30(LM, PV and EV), Fig. 31-

32 (SEM, PV and EV, Mag. 1.32 KX and Mag. 1.32 KX) Table 1].

Table 1: Pollen grain characteristics of *Cassia* species.

Sr. No.	Name of taxon	Pollen grain size (μm) P×E	Pollen shape	Aperture pattern	Colpi/pori size (μm)	Exine ornamentation
1	<i>Cassia alata</i>	31.30 × 28	Prolate Spheroidal	Trizonocolporate	19.19 × 4.5	Psilate
2	<i>Cassia auriculata</i>	26.04 × 34.86	Prolate spheroidal-Sub-prolate	Trizonocolporate	26.56 × 3.99	fossulate-rugulate or rarely coarsely reticulate.
3	<i>Cassia bicapsularis</i>	23.97 × 27.66	Suboblate-oblate spheroidal	Trizonocolporate	21.20 × 3.68	Microreticulate perforate
4	<i>Cassia biflora</i>	23.43 × 26.98	Sub-oblate	Trizonocolporate	22.72 × 2.84	Psilate perforate
5	<i>Cassia fistula</i>	24.5 × 27.25	Oblate spheroidal	Tricolporate	9.81 × 2.18	Punctitegillate?
6	<i>Cassia javanica</i>	24.32 × 36.8	Oblate-sub-oblate	Tricolporate	30-32 × 1.81	Psilate-microreticulate perforate
7	<i>Cassia occidentalis</i>	32.92 × 37.63	Sub-oblate-oblate spheroidal	Trizonocolporate	28 × 3.52	Finely reticulate
8	<i>Cassia obtusifolia</i>	36.45 × 42.84	Oblate spheroidal	Trizonocolporate	34.10 × 4.70	Microreticulate perforate
9	<i>Cassia siamea</i>	33.32 × 35.11	Oblate-spheroidal	Trizonocolporate	28.99 × 6.8	Psilate perforate
10	<i>Cassia tora</i>	29 × 34	Prolate spheroidal-Sub-prolate	Trizonocolporate	4.59 × 5.35	Psilate

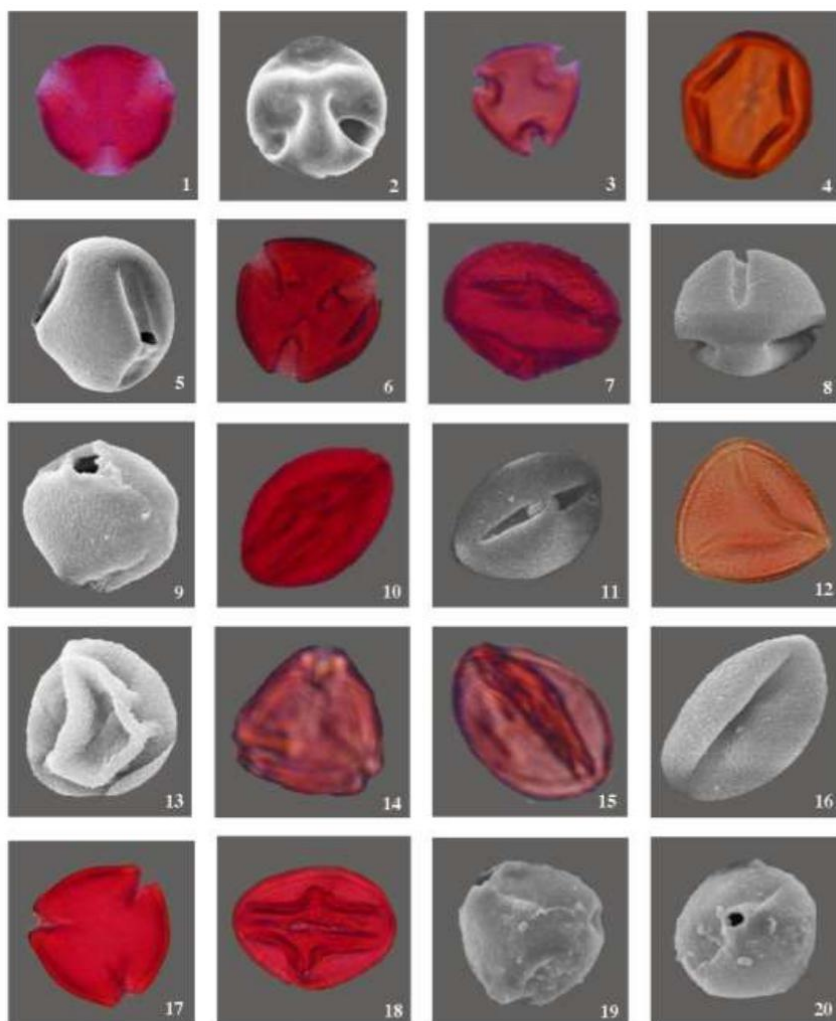


Fig. 1-20 Light and Scanning Electron Micrograph showing structure and exine sculpture of pollen grain: **Fig. 1-2** *Cassia alata* (PV), **Fig. 3-5** *Cassia auriculata* (PV and EV), **Fig. 6-9** *Cassia bicapsularis* (PV and EV), **Fig. 10-11** *Cassia biflora* (EV), **Fig. 12-13** *Cassia fistula* (PV), **Fig. 14-16** *Cassia javanica* (PV and EV), **Fig. 17-20** *Cassia occidentalis* (PV and EV). PV- Polar view, EV- Equatorial view.

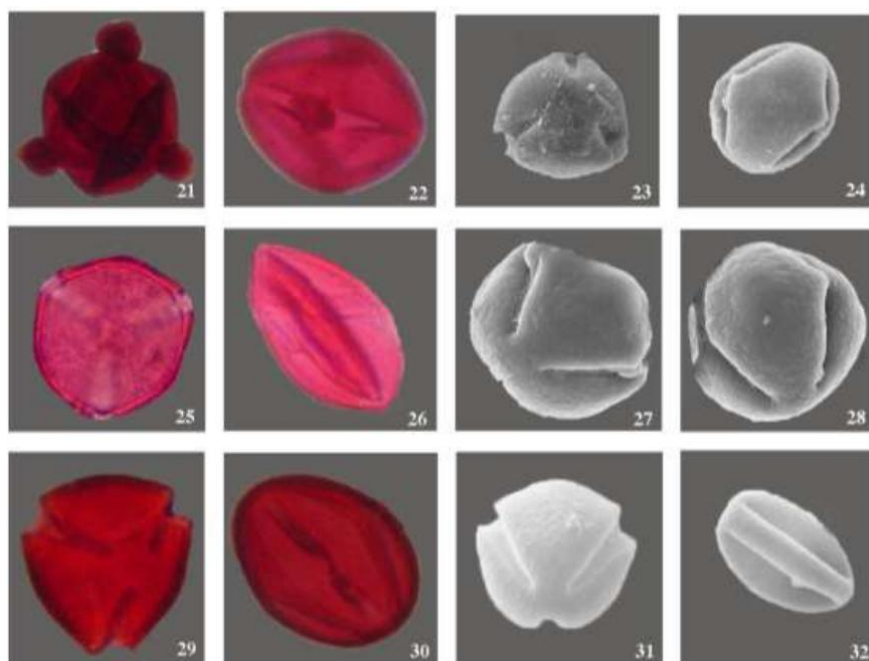


Fig. 21-32 Light and Scanning Electron Micrograph showing structure and exine sculpture of pollen grains: Fig. 21-24 *Cassia obtusifolia* (PV and EV), Fig. 25-28 *Cassia siamea* (PV and EV), Fig. 29-32 *Cassia tora* (PV and EV). PV- Polar view, EV- Equatorial view.

Discussion

Pollen morphological characteristics study is a precise method of relating and differentiating one plant genus from another. The present investigation on pollen micro-morphological characters suggests that qualitative and quantitative features of the pollen could be used to discriminate species.

In all ten *Cassia* species, many similarities in aperture type were observed, i.e. having feature tricolporate to trizonocporate. Psilate or psilate perforate tectum is noted in *Cassia tora*, *Cassia alata*, *Cassia siamea*, *Cassia javanica*, *Cassia biflora*, whereas reticulate or microreticulate exine pattern occurred in *Cassia occidentalis*, *Cassia auriculata*, *Cassia bicapsularis*, *Cassia obtusifolia*. In contrast to the above, *Cassia fistula* showed punctitegillate exine ornamentation. Rao and Lee (1970) and Aftab and Perveen (2006) reported similar exine ornamentation i.e. reticulate-rugulate

tectum within *Cassia fistula*, *Cassia javanica* and *Cassia siamea* based on LM. Whereas, in the present investigation, SEM observation reveals more clear reports showing different tectum namely punctitegillate or microreticulate perforate in *Cassia fistula*, psilate- microreticulate perforate in *Cassia javanica*, and psilate perforate in *Cassia siamea*. Besides, the other characters were found to be similar. Nayar (1990) studied pollen morphology of five genera of *Cassia* viz. *Cassia auriculata*, *Cassia fistula*, *Cassia mimosoides*, *Cassia occidentalis* and *Cassia tora*; and noted psilate tectum in all of them. While, in the present study, the same taxon of *Cassia* showed variable exine ornamentation, and the remaining characters showed homology.

Pollen morphological descriptions of various species of the genus *Cassia* L. were provided by a number of authors e.g. Vishnu-Mittre & Sharma (1962), Barth and Bouzada (1964),

Smith (1964), Maley (1970), Fredoux (1977). Most of these previous studies were based on LM techniques only. As a result, some discrepancies in their description from the present study were noticed. In addition, the use of different terminology is another factor that leads to differences in pollen morphological description between the present and previous studies. These differences may be due to different use of the same term or the same use of different terms, as previously noticed by El Ghazali (1993).

Conclusion

In the genus *Cassia* L., all ten species showed major similarity in aperture type i.e. tricolporate to trizonocoporate. Pollen micro-morphological characters suggest diversity in the studied genus *Cassia*. Among all studied characters SEM based surface structure was found to be most significant for the identification of species. The qualitative and quantitative micro-morphological features considered in this study have the potential utility to discriminate the species.

References

1. Abdalla, W. E. and El-Ghazali, G. E. B. "Pollen Morphological Study on the Genus *Cassia* L. sensu stricto from Sudan." *Australian Journal of Basic and Applied Sciences* 8 (2014): 436-443.
2. Aftab, R. U. and Anjum, P. "A palynological study of some cultivated trees from Karachi." *Pakistan Journal of Botany* 38.1 (2006): 15.
3. Agashe, S. N. "Palynology and Its Application." *Oxford and IBH Pub. Co. Pvt. Ltd.*, New Delhi (2006).
4. Airy, S. H. K. "A dictionary of the flowering plants and ferns." *Cambridge University Press*, London (1973).
5. Arora, A. and A. Modi. "An acetolysis technique for pollen slide preparation." *Indian J. Aerobiol* 21.2 (2008): 90-91.
6. Barth, O. M. and Bouzada, C. P. "Catálogo sistemático dos pólenes das plantas arbóreas do Brasil meridional: VI-Leguminosae: Caesalpinioideae." *Memórias do Instituto Oswaldo Cruz* 62 (1964): 169-92.
7. Bentham, G. "Revision of the genus *Cassia*." *Transactions of the Linnaean Society, London* 27 (1871): 503-91.
8. Bera, S. K., Basumatary, S. K. and Swati, D. "Studies on pollen morphology and phenological characteristics of some economically important arborescent taxa of Tropical forest lower Brahmaputra Valley, Assam, North East India." *Journal of Palynology* 43 (2009): 1-9.
9. Bhattacharya, K., Manas, R. M. and Swati, G. B. "A text Book of Palynology." *New Central Book Agency Pvt. Ltd.* Kolkata (2006).
10. Britton, N. L. "Caesalpinaceae." *North Amer. Flora* 23 (1930): 201-349.
11. El-Ghazali, G. E. B. "Pollen-stamen polymorphism in the Sudanese *Cassias* with special reference to *Cassia italica* (Leguminosae)." *Grana* 32.1 (1993): 13-21.
12. El-Ghazali, G. E. B. "A Study on the Pollen Flora of Sudan with Special Reference to Pollen Identification." *Ph.D. Thesis, University of Bergen, Norway* (1989).
13. Erdtman, G. "Pollen Morphology and Plant Taxonomy of Angiosperms." *Almqvist and Wiksell, Stockholm* (1952).
14. Erdtman, G. "The acetolysis method-a revised description." *Sven Bot Tidskr* 54 (1960): 516-64.
15. Faegri, K. and Iversen, J. "Text book of Pollen Analysis. Munksgaard, flowering plants." *The Botanical Review* 58 (1964): 225-348.
16. Faegri, K., Peter, E. K. and Knut, K. "Textbook of pollen analysis." *John Wiley & Sons Ltd* (1989).
17. Fredoux, A. "Etude Morphologique des Pollens de 32 Espèces des Formations Peri-lagunaires de Basse Cote-d'Ivoire (lagune Adjin)." *Candollea* 32 (1977): 281-303.

18. Irwin, H. S. and Rupert, C. B. "The American Cassiinae: a synoptical revision of Leguminosae tribe Cassieae subtribe Cassiinae in the New World." *Memoirs of the New York Botanical Garden* 35 (1982): 455-918.
19. Irwin, H. S. and Turner, B. L. "Chromosomal relationships and taxonomic considerations in the genus *Cassia*." *American Journal of Botany* 47.4 (1960): 309-318.
20. Jumah, A. "Studies on the Morphology of Pollen Grains of the Leguminosae-The Caesalpinoideae." *Ghana Journal of Science* 31.3 (1991): 23-8.
21. Keshavarzi, M., Sousan, A. And Masoud, S. "Pollen morphology of the genus *Chyphola* (Brassicaceae) in Iran." *Phytologia balcanica* 18.1 (2012):17-24.
22. Labouriau, M. S., Vanzolini, P. E. and Melhem, T. S. "Variation of polar axes and equatorial diameters in pollen grains of two species of *Cassia*." *Grana* 6.1 (1965):166-176.
23. Maley, J. "Contributions a l'etude du Bassin tchadien Atlas de pollens du Tchad." *Bulletin du Jardin botanique national de Belgique/Bulletin van de Nationale Plantentuin van België* 31 (1970): 29-48.
24. Marazzi, B., Peter, K. E., Luciano, P. D. Q. And Elena, C. "Phylogenetic relationships within *Senna* (Leguminosae, Cassiinae) based on three chloroplast DNA regions: patterns in the evolution of floral symmetry and extrafloral nectaries." *American Journal of Botany* 93.2 (2006): 288-303.
25. Naik, V. N. "Flora of Marathwada." Vol.1 and 2 *Amrut prakashan, Aurangabad* (1989).
26. Nair, P. K. K. and M. Sharma. "Pollen grains of Indian Plants - IV Leguminosae Part 1." *Bulletin of National Botanic Gardens, Lucknow* (1962).
27. Nayar, T. S. "Pollen flora of Maharashtra State India." *Today and Tomorrows Publishers, New Delhi* (1990).
28. Perveen, A. "A contribution to the pollen morphology of family Gramineae." *World Applied Sciences Journal* 1.2 (2006): 60-65.
29. Punt, W., Hoen, P. P., Stephen, B., Siwert, N. and Annick, L. T. "Glossary of pollen and spore terminology." *Review of Palaeobotany and Palynology* 143.1-2 (2007): 1-81.
30. Rao, A. N. and Lee, Y. K. "Studies on Singapore pollen." *Pacific science* 24 (1970): 255-268.
31. Singh, V. "Monograph on Indian subtribe Cassiinae (Caesalpiniaceae)." *Scientific Publishers, Jodhpur* (2001).
32. Smith, F. G. "Some pollen grains in the Caesalpiniaceae of East Africa." *Pollen et Spores* 6.1 (1964):85-111.
33. Soladoye, M. O., Monsurat, A. O. and Mubo, A. S. "Morphometric Study of Genus *Senna* Mill. in South-eastern Nigeria." *African Journal of Plant Science* 4.3 (2010): 44-52.
34. Vishnu, M. and Sharma, B. D. "Studies of Indian Pollen Grains. 1 Leguminosae." *Pollen Spores* 4.1 (1962): 5-45.
35. Yadav, S. R. and Sardesai, M. M. "Flora of Kolhapur district". *Shivaji University, Kolhapur* (2002).

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Rajurkar, A.V. and Vivek, R.N. "Diversity Assessment in Some *Cassia* Species Based on Pollen Morphological Characters in Vidarbha Region of Maharashtra, India." *Annals of Plant Sciences*.11.1 (2022): pp. 4662-4669.

DOI: <http://dx.doi.org/10.21746/aps.2022.11.1.14>

About Wild life and Environment Conservation Society

It was about a decade ago the handful of individuals sharing a common interest in the study of vegetation, bird watching, walking tours or trekking in Melghat and environmental awareness had come together to start this organization. After the registration of the same in 2001 gradually the activities of the organization started. In an age of multiple environmental problems it has become the need of the hour to work towards the study and conservation of wild life and spread awareness among the masses.

Main objectives of the Wildlife and Environment Conservation Society

1. Create awareness about the clean and healthy environment.
2. Generate interest towards the nature among the students and general public with the help of activities like bird watching, butterfly watching, trekking or nature walks and adventure.
3. To study and do research on the diversity of flora and fauna.
4. Create mass awareness about the conservation of Forts Caves and other historic monuments.
5. Create mass awareness about the legal aspects of wildlife conservation.
6. Generate interest among the school and college students towards the nature.
7. Create mass awareness about snakes and poaching of birds and other animals to prevent their killing.

Annexure I

In joint venture following activities will be conducted.

- Organization of Guest lectures, slide shows, film shows and nature camps on Conservation of Environment for the students.
- Regular organization of activities like bird watching, Nature trek to create interest among the students.
- Extensive study and documentation of avian diversity of the region and keeping records.
- Creating awareness about the protection of forts and other historical monuments.
- Arranging lectures and slide shows to create awareness about the snakes in agriculture and Environment.
- Providing information about poisons and non poisons snakes to prevent their killing and for to conserve them.

- To create mass awareness over various types of pollutions occurs during festivals.
- Arrange tree plantation programme and promote indigenous species plantation and create awareness against the use of plastic bags that poses a greater threat to the environment.
- Initiate research in the field of wild life conservation.
- Conduct workshops, seminar, poster presentation, and conferences in the field of Environment related sectors.

Annexure II

Participation of students in the following activities

- Participation in Clay Ganesh Idol Campaign
- Nature walk programme in Melghat during the months of August and January.
- Study of migratory birds during winter season.
- Butterfly watch and study programme in Melghat and Pohra forest.
- Trekking tours to the forest like Gawilgad and Namala.
- Participation in adventure camp like mountaineering and trekking
- Tree plantation in Campus during July and August.



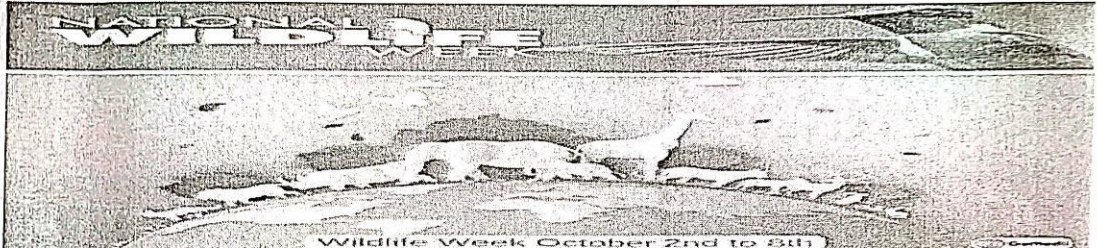
LATE BABASAHEB VARHADE EDUCATION SOCIETY
**Mahatma Jyotiba Fule Commerce, Science &
 Vitthalrao Raut Art's College.**
 Bhakkuli, Amravati, Maharashtra.



SATPUDA VIKAS VA GRAMIN SHIKSHAN SANTHA'S
**Bapuniya Sirajoddin Patel Arts, Commerce and
 Science College.**
 Kurba Road, Pimpalgaon Kale, Tq. Jalgaon(Jamed)
 Dist-Buldhana, Maharashtra.



Department of Zoology under IQAC Jointly Celebrating



Wildlife Week, October 2nd to 8th

Wildlife is a precious gift to this planet from nature, which includes animal and plant species inhabiting their natural environment. With an aim to protect and preserve this precious wildlife of India, and to raise the awareness about the long term goals of protecting the wildlife of India a Wildlife Week is annually celebrated across India in first week of October. The first Wildlife Week was observed in 1957. The main focus of wildlife week celebration is to develop healthy and favorable environment for animal and plant and to preserve them. National Wildlife Week is a time to celebrate the amazing wildlife of our country. Conserving and protecting wildlife not only saves animals, plant and beautiful natural spaces, but it also saves our future. We save ourselves when we save wildlife.

निसर्गाचा देवा ,येणाऱ्या पिढीला, काही देवा.....

It gives us immense pleasure to announce that we are organizing an Online Quiz Competition on Current Year's Theme "Forest and Livelihood: Sustaining people and Planet", A Poster Presentation Competition on Theme Wildlife Conservation and an Online Webinar on Topic "All About Owls".

Dates & Time		
04/10/2021	Monday	Quiz Competition
02-06 Oct 2021	Sat-Friday	Poster Competition
07/10/2021	Thursday	Webinar and Prize Distribution

Quiz Competition

A quiz Competition is Organized on the occasion of World Animal day Observed on 4th October on Current Year theme "Forest and Livelihood: Sustaining People and Planet".

1. Quiz is Open for all UG and PG Students.
2. Each Question Carries One Mark.
3. Quiz is accessible on the following link.
4. <http://forms.gle/7N5u0t0176C711b5Y26>
5. L-Certificates Will be provided to all the students.

Poster Competition

Theme: Wildlife Conservation

- 1) Register yourself for the competition using Registration link: <https://forms.gle/7N5u0t0176C711b5Y26>
- 2) Competition is open for UG and PG students.
- 3) Poster should be prepared by hand, on Chart of standard size (30x40cm)
- 4) Click the photographs of poster.
- 5) Upload it in the people form in the given link: <https://forms.gle/7N5u0t0176C711b5Y26>
- 6) Participants can submit their poster's from 2nd to 6th October.

Prize worth certificates

1st 1500/-
 2nd 1000/-
 3rd 800/-

Webinar

Dr. Jyoti Wadhwa
 Professor
 Maharashtra Pigeonaries and
 Veterinary Wildlife Welfare
 Amravati District

A Well Known Conservationist and environmentalist. A Honorary Wildlife warden of Amravati district and Author of Popular books. He is president of a wildlife conservation society known as Panchamata. He has served wildlife in all his capabilities.

Join Zoom Meeting
 Meeting ID: 915 524 3027
 Meeting ID: 915 524 3027
 Password: 876543
 Join: 1:00 pm

Chairperson

Dr. I. A. Kaji
 Professor
 B. S. Puro Arts, Commerce and Science College,
 Pimpalgaon Kale

Dr. N. S. Jaisankar
 Principal
 B. S. Puro Arts, Commerce and Science College,
 Pimpalgaon Kale

Organizing Committee

Dr. Prakash N. Bhatnagar
 Head of Department Zoology
 B. S. Puro Arts, Commerce and Science College, Pimpalgaon Kale

Dr. Anurag S. Wadhwa
 Assistant Professor Dept. of Zoology
 B. S. Puro Arts, Commerce and Science College, Pimpalgaon Kale

Dr. R. A. Qureshi
 Dept. Zoology
 B. S. Puro Arts, Commerce and Science College, Pimpalgaon Kale

Dr. Arvind B. Bagde
 Head of Department Zoology
 B. S. Puro Arts, Commerce and Science College, Pimpalgaon Kale

Dr. Ashish U. Chavhan
 Assistant Professor Dept. of Zoology
 B. S. Puro Arts, Commerce and Science College, Pimpalgaon Kale

Dr. N. D. Mahabadi
 B.S.P. Arts, Commerce and Science College, Pimpalgaon Kale

**Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut
Arts College, Bhatkuli.. Dist-Amravati.**

Department of Zoology

Report 2021-22

Activity: - 'National Wildlife Week Celebration'

Date: 2nd to 8th Oct 2021

Time: - 12 to 5 pm

Participant: - 100

Venue: - Zoom cloud meeting and Online media (Google form and WhatsApp)

Guest and Judge:

- 1) Dr. Jayant Wadkar (well-known conservationist and environmentalist)
- 2) Dr. A. B. Ingole (Assistant Professor and Head, department of Zoology Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts, College, Bhatkuli Amravati)
- 3) Miss Pranjakta Bathe (Assistant Professor and Head, department of Zoology Bapumiya Sirajoddin Patel Arts, Commerce & Science college Pimpalgaon kale.

Objectives: -

1. To create awareness among students about the importance of wildlife biodiversity.
2. To create awareness about the protection and conservation of wildlife animals.
3. To gain knowledge about biodiversity in our region.
4. To explore & improvise their artistic skills.
5. To make students technology friendly.

Schedule of the Wildlife week: -

Sr. No.	Date	Day	Event	Theme/Topic
1	04/10/2021	Monday	Quiz Competition	Forest and Livelihood: Sustaining People and Planet Wildlife Conservation
2	02-06/10/2021	Sat-Friday	Poster Competition	
3	07/10/2021	Thursday	Webinar and Prize Distribution	All About Owls

Program Highlights: -

National Wildlife Week is annually celebrated across India between 2nd to 8th October with an aim to protect and preserve the flora and fauna of India. First ever wildlife week was

observed in the year 1957. Wildlife Week 2021 is the 67th edition and is being celebrated under the theme 'Forest and Livelihoods: Sustaining People and Planet'. The main focus of wildlife week celebration is to develop healthy and favourable environment for animal and plant and to preserve them. National Wildlife Week is a time to celebrate the amazing wildlife of our country. Conserving and protecting wildlife not only save animals, plant and beautiful natural spaces, but it also saves our future. We can save ourselves when we protect wildlife.

National Wildlife Week 2021 was jointly organized by, Department of Zoology under IQAC, Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts, College, Bhatkuli Amravati and IQAC Bapumiya Sirajoddin Patel Arts, Commerce & Science college Pimpalgaon kale, in collaboration with Wildlife and Environment Conservation Society Amravati.

On 4th October, Quiz competition was held online through Google quiz form on theme 'Forest and Livelihood: Sustaining People and Planet' the students were actively participated and E-certificate were provided to the student who achieved more than 50 percent marks.

Link for the Quiz Competition: <https://forms.gle/PXwmByB7oCBBr5Y26>

From 2th October to 6th October Poster Competition were organized on the 'Wildlife Conservation'. The students from the different Colleges were actively participated for the said competition and showed their talent and views in the form of Poster for wildlife conservation. The judges of Poster competition were Dr. I. A. Raja Principal, Miss Prajakta Bathe Head, Zoology Department, B. S. Patel Art, Commerce and Science College, Pimpalgaon kale and Dr. Ingole Head, Mr. Sumit Wankahde and Dr. Gaware, Zoology Department MJF Commerce, Science and Arts College Bhatkuli. Amravati. Total 30 entries were enrolled from the various institutions.

Link of Poster Competition: <https://forms.gle/jB47vcZx1a95UvJu8>

The following students bagged the I, II and III positions in 'Online Poster Competition'.

Student Name	College Name	Class	Rank	Cash Prize
Payal Samanta	Guru Nanak Khalsa Autonomous College of Arts Science and Commerce, Matunga. Mumbai	B.Sc. II	First	1500/-
Sakshi Lande	MJF Commerce, Science and Arts College Bhatkuli. Amravati	B.Sc. III	Second	1000/-
Vaishnavi Deshmukh	B. S. Patel Arts, Come and Science College. Pimpalgaon Kale. Buldhana	B.Sc. III	Third	500/-

On 7th October, a webinar was organized for the students on a very unique and interesting topic, 'All About Owls'. The guest speaker for this webinar was Dr. Jayant Wadatkar a well-known conservationist and environmentalist. An Honorary Wildlife warden of Amravati district and Author of Popular books. He is a president of wildlife

conservation society known as Pakshimitra. He has served wildlife in all his capabilities. The webinar was conducted through a Zoom cloud meeting. Total 97 participants were enrolled for webinar.

Zoom link : <https://us04web.zoom.us/j/73352433027?pwd=V0d5UnhPbDVDNlVlajBaZE5pSTEWQT09>
Meeting ID: 733 5243 3027 Passcode: fY8LXe

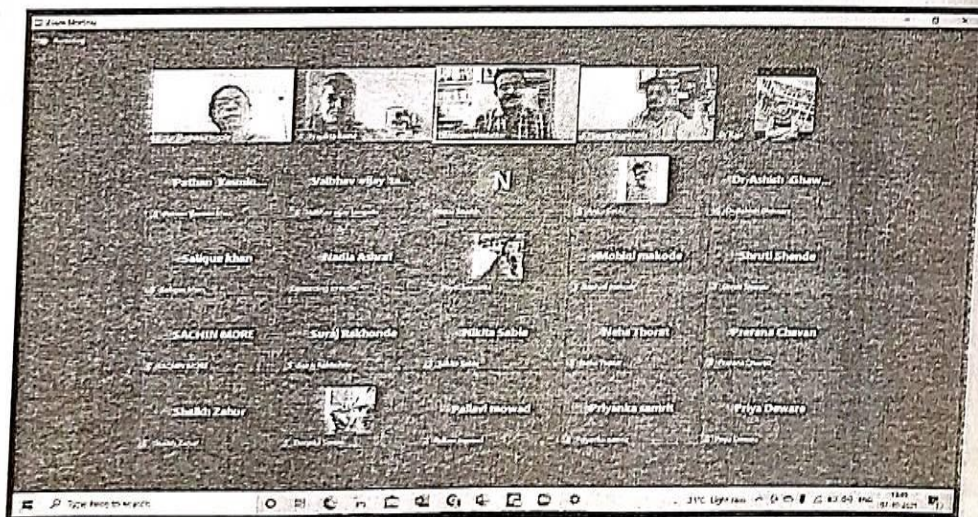
The main motto behind conducting this webinar was to make students aware towards the Owls and nature. The said program was inaugurated virtually by Dr. I. A. Raja, Principal B. S. Patel Art, commerce and science college Pimpalgaon kale. He shared his views regarding to role of students toward wildlife conservation. Dr. Ingole madam told all participants about wildlife week and our motto for celebration. The guest speaker Dr. Wadatkar Sir, told Everything about the owls. He enlightens on diversity, habit and habitat of Owls. He also explained about importance and conservation of Owls. After the webinar he interacted with students and solve various quires regarding to the topic.

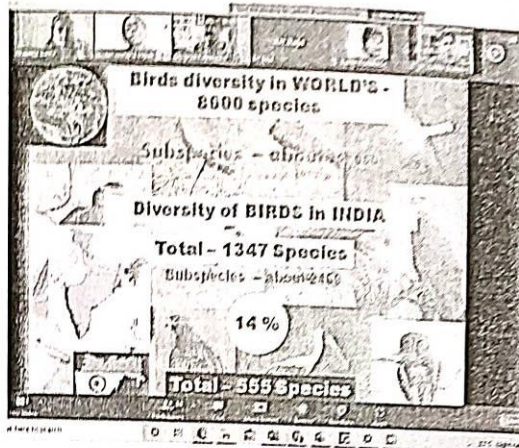
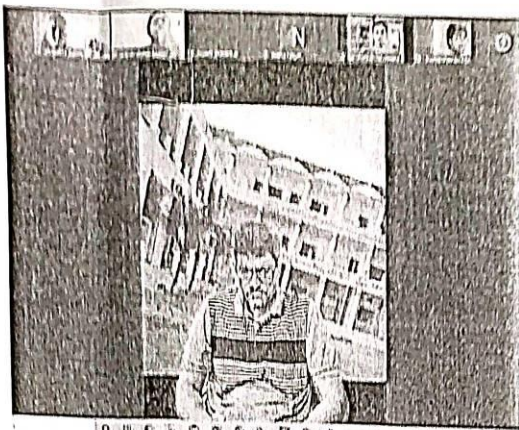
The winners of the poster competition were awarded with Certificate and Cash prize from the Zoology Department of both colleges by Dr. Jayant Wadatkar. It was an interesting week for students as they participated in the competitions and webinar with great enthusiasm. Vote of thanks was given by Prof. Sumit Wankhade and Prof. Bathe anchored the session.

Outcome: -

1. Students got knowledge about wildlife biodiversity.
2. Competitions helped students to uncover their natural talents in sketching and illustrations.
3. Constant learning and self-motivation is the key to success as an artist and these competitions help to instill these habits in students.

Photos: -



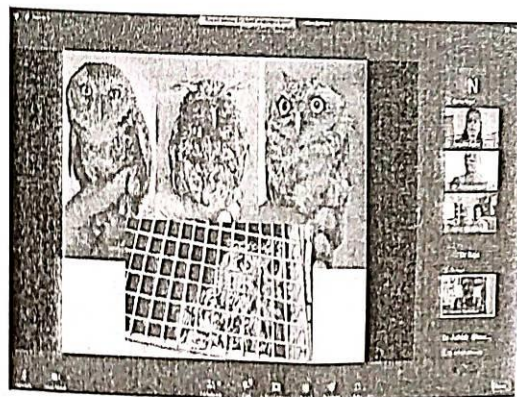
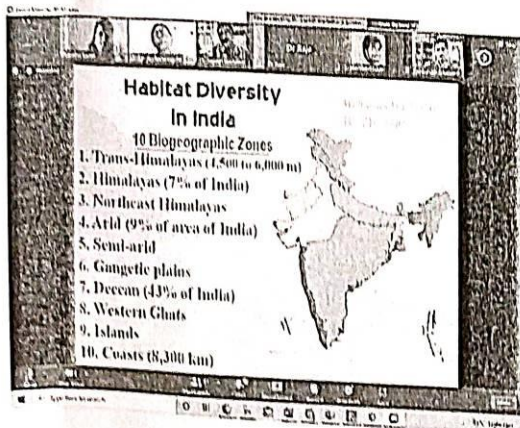


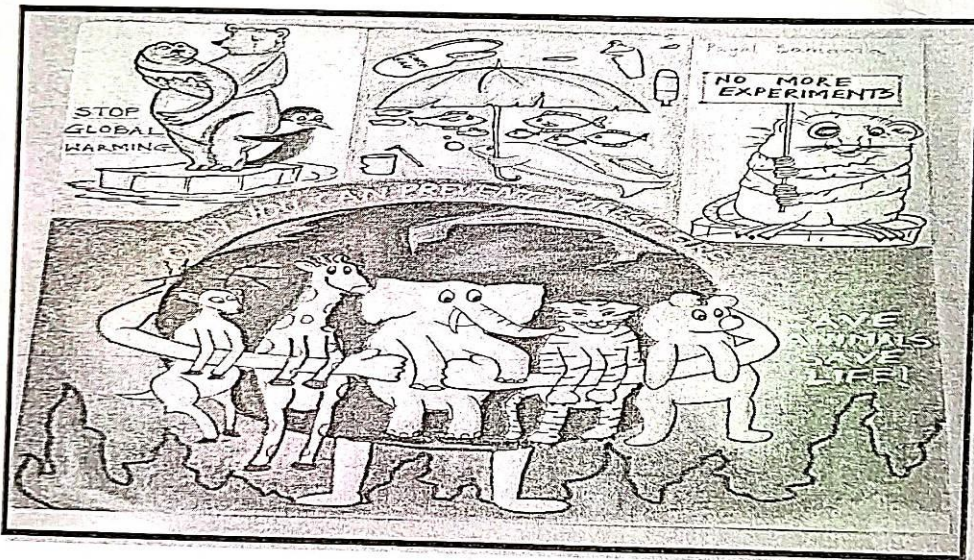
ALL ABOUT OWLS

घुबडीविषय

बोलू काह

Dr. JAYANT WADATKAR
Horn Wildlife Warden





In 2010 and onwards, Human-Animals conflicts are on the rise. In previous years, some rare animals become extinct. So, it's time for

WILDLIFE CONSERVATION

"Practice of protecting animal species and habitat"

WHAT?
Conservation of wildlife leads to enhance the number of animals and save species.

HOW?
It's our home. So, whenever you try not to harm nature and natural habitat.

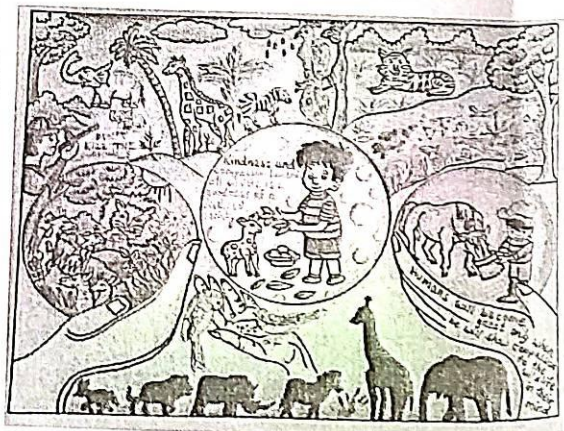
WHO?
Everyone born on this planet can conserve and contribute, specially, youth because they have the energy but need direction.

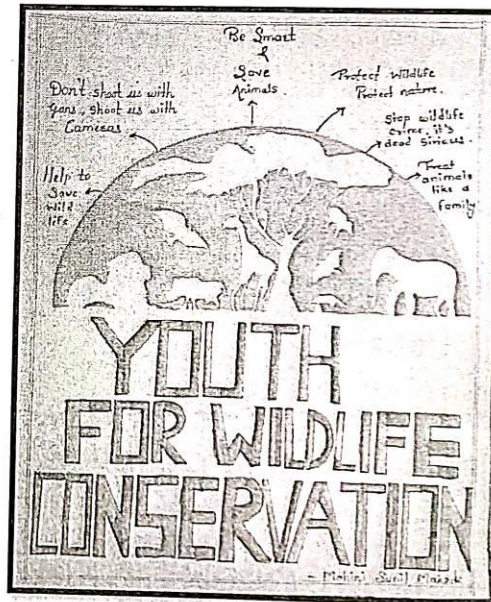
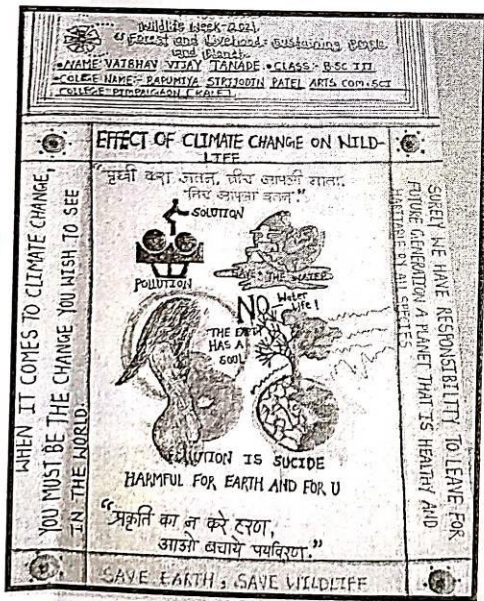
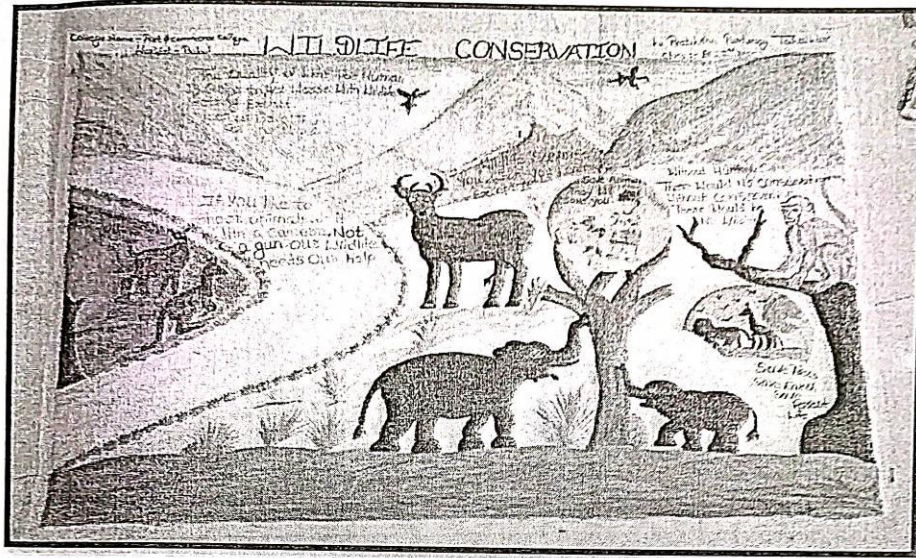
WHAT TECHNOLOGY HELP?
Technology can help you out by saving people through media. Also, digital technology can generate rare ones and investigate peoples, so that they don't leaving the planet.

EFFECTS?
Conservation leads to increase in our family members, and decrease human animal conflicts. For that, Do not disturb our life.

There are various ways for protection of conservation, but every will affect only when it's done.

"TIME TO STAND UP FOR WILDLIFE AND GO WILD."





Prizes and Certificates

LATE BABASAHEB VARGHADE EDUCATION SOCIETY
Mahatma Jyotiba Fule Commerce, Science & V.R. Art's College, Bhatkuli.
 In Collaboration with
SATPUDA BHISHANI VAGRAMIN VIKAS SANSTHA,
Bapuniya Sirajoddin Patel Arts, Commerce and Science College,
Pimpalgaon Kale.

CERTIFICATE

This is to certify that **Mr. Miss. Pajal Naresh** of **College Ganga Nandaji Khatke Jambhavanthi College of Arts Science and Commerce** has secured **First Rank** in **'Online Poster Competition'** on eve of **"National Wildlife Week"** jointly organized by Department of Zoology, Mahatma Jyotiba Fule Commerce, Science and Vithalrao Khatke Art's College Bhatkuli in collaboration with IQAC, Bapuniya Sirajoddin Patel Arts, Commerce and Science College, Pimpalgaon Kale on 2-6 October, 2021.
 Your participation is highly appreciated.

Dr. I. A. Raja
Principal
B.S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Dr. K. B. Jambhade
Principal
M. J. P. Commerce Science
and V. R. Art College Bhatkuli

Dr. A. B. Ingole
Head, Zoology Department
B. S. Patel Art, Commerce Science
and V. R. Art College Bhatkuli

Ms. P. H. Bhathe
Head, English Department
B. S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Transaction ID
P2110091142292235031041

Paid to
XXXXXXXXXX1071
Bhatke Educational Bank (Maharashtra)
₹1,500

Debited from
*****3531
UPI: 1262215021555
₹1,500

Money sitting idle in your bank account? Move it to Liquid Funds and give it a chance to grow.

Contact Phone/Pe Support

Powered by
E2-Next LPM **KLYBANK** CREDIT BANK

LATE BABASAHEB VARGHADE EDUCATION SOCIETY
Mahatma Jyotiba Fule Commerce, Science & V.R. Art's College, Bhatkuli.
 In Collaboration with
SATPUDA BHISHANI VAGRAMIN VIKAS SANSTHA,
Bapuniya Sirajoddin Patel Arts, Commerce and Science College,
Pimpalgaon Kale.

CERTIFICATE

This is to certify that **Mr. Sakshi Dilip Inamte** of **College Mahatma J. Fule Commerce, Science and Vithalrao Khatke Arts College, Bhatkuli** has secured **Second Rank** in **'Online Poster Competition'** on eve of **"National Wildlife Week"** jointly organized by Department of Zoology, Mahatma Jyotiba Fule Commerce, Science and Vithalrao Khatke Art's College Bhatkuli in collaboration with IQAC, Bapuniya Sirajoddin Patel Arts, Commerce and Science College, Pimpalgaon Kale on 2-6 October, 2021.
 Your participation is highly appreciated.

Dr. I. A. Raja
Principal
B.S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Dr. K. B. Jambhade
Principal
M. J. P. Commerce Science
and V. R. Art College Bhatkuli

Dr. A. B. Ingole
Head, Zoology Department
B. S. Patel Art, Commerce Science
and V. R. Art College Bhatkuli

Ms. P. H. Bhathe
Head, English Department
B. S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Transaction ID
P2110091050294390267380

Paid to
Sakshi Dilip Inamte
XXXXXXXXX110
Bank Of Maharashtra
₹1,000

Debited from
*****3531
UPI: 126215021555
₹1,000

Money sitting idle in your bank account? Move it to Liquid Funds and give it a chance to grow.

Contact Phone/Pe Support

Powered by
E2-Next LPM **KLYBANK** CREDIT BANK

LATE BABASAHEB VARGHADE EDUCATION SOCIETY
Mahatma Jyotiba Fule Commerce, Science & V.R. Art's College, Bhatkuli.
 In Collaboration with
SATPUDA BHISHANI VAGRAMIN VIKAS SANSTHA,
Bapuniya Sirajoddin Patel Arts, Commerce and Science College,
Pimpalgaon Kale.

CERTIFICATE

This is to certify that **Mr. Miss. Vaishnavi Dhresh Deshmukh** of **College Bapuniya Sirajoddin Patel Arts, Commerce and Science college Pimpalgaon Kale** has secured **Third Rank** in **'Online Poster Competition'** on eve of **"National Wildlife Week"** jointly organized by Department of Zoology, Mahatma Jyotiba Fule Commerce, Science and Vithalrao Khatke Art's College Bhatkuli in collaboration with IQAC, Bapuniya Sirajoddin Patel Arts, Commerce and Science College, Pimpalgaon Kale on 2-6 October, 2021.
 Your participation is highly appreciated.

Dr. I. A. Raja
Principal
B.S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Dr. K. B. Jambhade
Principal
M. J. P. Commerce Science
and V. R. Art College Bhatkuli

Dr. A. B. Ingole
Head, Zoology Department
B. S. Patel Art, Commerce Science
and V. R. Art College Bhatkuli

Ms. P. H. Bhathe
Head, English Department
B. S. Patel Art, Commerce and Science
College, Pimpalgaon Kale

Transaction ID
P2110091410217849087548

Paid to
KOPKAR1004
State Bank of India
₹500

Debited from
*****3531
UPI: 1262215021555
₹500

Money sitting idle in your bank account? Move it to Liquid Funds and give it a chance to grow.

Contact Phone/Pe Support

Powered by
E2-Next LPM **KLYBANK** CREDIT BANK

Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut
Arts College, Bhatkuli.. Dist-Amravati.

Department of Zoology

Report -2020-2021

“WORLD WILDLIFE WEEK”

WILDLIFE PHOTOGRAPHY COMPETITION

Date: 03 Oct 2020

Participant: - 52



Late Babasaheb Varhade Education Society, Amravati's
Mahatma Jyotiba Fule Commerce, Science
and Vitthalrao Raut Arts College, Bhatkulli.
Affiliated to Sant Gadge Baba Amravati University, Amravati
Accredited with 'B' Grade by NAAC



WORLD WILDLIFE WEEK-2020
Department of Zoology

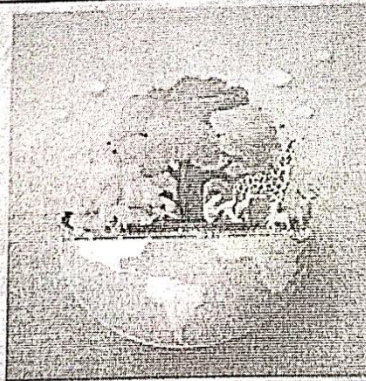
organizes

**Wildlife Photography
Competition**

Theme: Arthropods

Principal
Dr. K. S. Jannalkhede

Dr. A. U. Ghaware
Assistant professor
Department of Zoology



Convener
Dr. A. B. Ingole
Head
Dept. of Zoology

Prof. S. S. Wankhede
Assistant professor
Department of Zoology

Exciting Prizes will be given to best entries

Contact:9552246959,7620392258

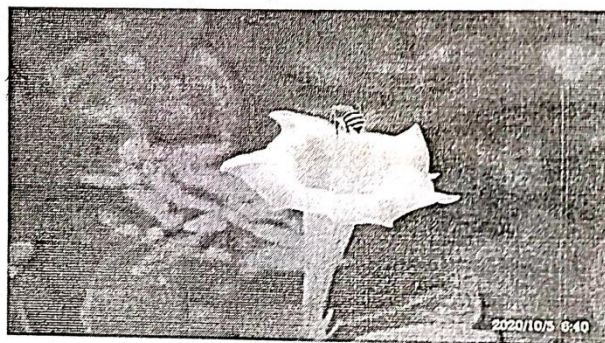
National Wildlife Week is annually celebrated across India between 2nd to 8th October with an aim to protect and preserve the flora and fauna of India. First ever wildlife week was observed in the year 1957. Wildlife Week 2020 is the 66th edition and is being celebrated under the theme 'Sustaining all life on earth'. The main focus of wildlife week celebration is to develop healthy and favourable environment for animal and plant and to preserve them. National Wildlife Week is a time to celebrate the amazing wildlife of our country. Conserving and protecting wildlife not only save animals, plant and beautiful natural spaces, but it also saves our future. We can save ourselves when we protect wildlife.

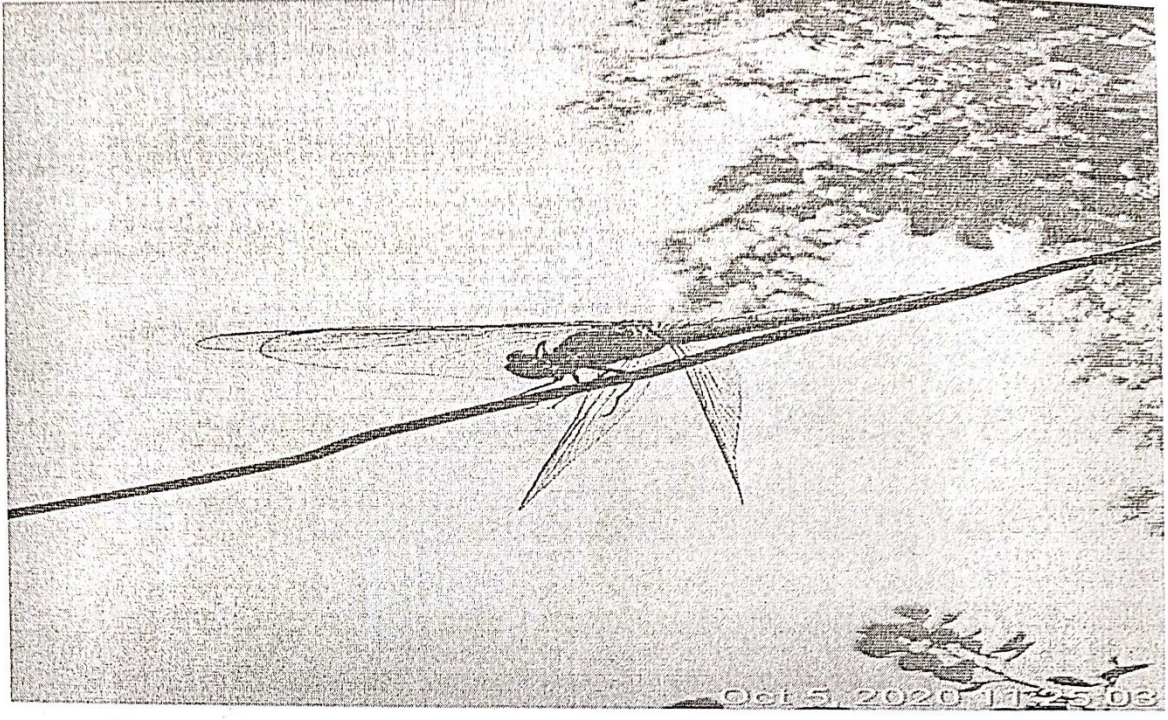
National Wildlife Week 2020 was jointly organized by, Department of Zoology under IQAC, Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts, College, Bhatkuli Amravati in collaboration with Wildlife and Environment Conservation Society Amravati.

An Online wildlife photography competition was organized on this occasion from the behalf of department of zoology on theme Arthropods aiming to develop Photography skills and the ability to critically look into the varied frames and angles of nature. Entries were invited from B.Sc I,II,III zoology students. 52 Students from three class registered for the competition.

One Winners from each class B.sc I, II and III year are selected respectively.

- Neha Thorat (B.Sc I)
- Ravi Tayde (B.sc II)
- Pallavi Lande (B.sc III)





Participants:

Timestamp	Name	Class	Upload File
10/9/2020 14:43:28	PAyal Prashant wankhade	2nd year b.sc	https://drive.google.com/open?id=1-alv8gDvp4MCOXSz4-WugOWmA35KVc2P
10/10/2020 11:57:44	Sakshi Dilip Lande	BSC 2nd Year	https://drive.google.com/open?id=1rszqK0dGr2DFK-sPzsK4gv8AiqYbm2vr
10/10/2020 14:15:42	PAyal Prashant wankhade	2nd year b.sc	https://drive.google.com/open?id=1JVRd3wNfXVE0NYWvxzSw1IvbF1HU8xqd
10/10/2020 14:18:24	Dhanashri Mukundrao Thosao	BSC 2nd year	https://drive.google.com/open?id=1pb2i_9_ijgwcc-XBHUCCLuaqSNTwces_U
10/10/2020 17:54:50	Pallavi prakash lande	B. Sc 2nd year	https://drive.google.com/open?id=1rntHjB8F2CMfmuuVpQprrcTSP1veRVCu https://drive.google.com/open?id=1BDmZEJat1vdqoRuv154Kfh3evYzeGTXL
10/10/2020 19:25:33	ANKita Rajesh koyakade	BSC 2nd year	https://drive.google.com/open?id=1rJpHQdpbb01MpdnTQSAAuQ7VcpGY7vKK https://drive.google.com/open?id=1yffZkPvL2JWMYZzRcNvWkyuKJ_dPn8-e
10/10/2020 19:47:54	Aakash tidke	Bsc second year	https://drive.google.com/open?id=1nFLtruM3h_RT3iykhdFwsVnyOPIN8Trk https://drive.google.com/open?id=1tIEV6m6ojr67IKRhQDEqfvKkNyy36lrcf
10/10/2020 20:00:43	Salique Ahmed khan	Bsc 2nd year	https://drive.google.com/open?id=1jfmCTnuQs0W1v04S0zbzmyaBTDIKfEv8
10/10/2020 21:02:00	Syed Parvez Musharraf	3yer 5sem	https://drive.google.com/open?id=1rlVr15vXBesmhxJHlbHqrT-2V1hGHf8f https://drive.google.com/open?id=1LhFsRYQAV6QImErLQWWjU4LIII2AIIrV
10/11/2020 11:11:38	Mohd Mohsin Mohd Matin	Bsc II year CBZ	https://drive.google.com/open?id=1KHCGXf3N6f0LifvPw18ljgCbT0dH-DiE
10/9/2020 14:43:28	Ravi Tayde	Bsc II	https://drive.google.com/open?id=1-alv8gDvp4MCOXSz4-WugOWmA35KVc2P
10/10/2020 11:57:44	Komal Ghurde	Bsc II	https://drive.google.com/open?id=1rszqK0dGr2DFK-sPzsK4gv8AiqYbm2vr
10/10/2020 14:15:42	Pallavi Raut	Bsc II	https://drive.google.com/open?id=1JVRd3wNfXVE0NYWvxzSw1IvbF1HU8xqd
10/10/2020 14:18:24	Sandhya Khandare	Bsc II	https://drive.google.com/open?id=1pb2i_9_ijgwcc-XBHUCCLuaqSNTwces_U
10/10/2020 17:54:50	Shraddha Mohod	Bsc II	https://drive.google.com/open?id=1rntHjB8F2CMfmuuVpQprrcTSP1veRVCu https://drive.google.com/open?id=1BDmZEJat1vdqoRuv154Kfh3evYzeGTXL
10/10/2020 19:25:33	Gauri Dhoke	Bsc I year	https://drive.google.com/open?id=1rJpHQdpbb01MpdnTQSAAuQ7VcpGY7vKK https://drive.google.com/open?id=1yffZkPvL2JWMYZzRcNvWkyuKJ_dPn8-e
10/10/2020 19:47:54	Manoj Pethe	Bsc I	https://drive.google.com/open?id=1nFLtruM3h_RT3iykhdFwsVnyOPIN8Trk https://drive.google.com/open?id=1tIEV6m6ojr67IKRhQDEqfvKkNyy36lrcf
10/10/2020 20:00:43	Fardin KhaN	BSC I	https://drive.google.com/open?id=1jfmCTnuQs0W1v04S0zbzmyaBTDIKfEv8
10/10/2020 21:02:00	Prajwal Umak	BSC III	https://drive.google.com/open?id=1rlVr15vXBesmhxJHlbHqrT-2V1hGHf8f https://drive.google.com/open?id=1LhFsRYQAV6QImErLQWWjU4LIII2AIIrV
10/11/2020 11:11:38	Aakash Bhatkulkar	Bsc III	https://drive.google.com/open?id=1KHCGXf3N6f0LifvPw18ljgCbT0dH-DiE



LATE BABASAHEB VARHADE EDUCATION SOCIETY, AMRAVATI'S
**MAHATMA JYOTIBA FULE COMMERCE, SCIENCE
 AND VITTHALRAO RAUT ART'S COLLEGE,**
 BHATKULI, DIST. AMRAVATI - 444602.



Accredited by NAAC with 'B' Grade
 Web Site: www.mjfbhatkuli.org.in Email: principal.bhatkuli@gmail.com

Dr. Aakash A. Varhade
 President

Dr. K. S. Jamdhade
 Principal

MEMORANDUM
 OF
 UNDERSTANDING

BETWEEN

MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT
 ARTS COLLEGE, BHATKULI
 AND

SMT. RADHABAI SARDA ART'S, SCIENCE & COMMERCE COLLEGE
 ANJANGAO SURJI, DIST. AMRAVATI.

INTRODUCTION:

This Memorandum of Understanding is hereby made and entered into by and between Department of Home Economics, MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT ARTS COLLEGE, BHATKULI, 444602 DIST. AMRAVATI and Department of Home- Economics Smt. Radhabai Sarada Art's, Science & Commerce College Anjangao Surji. Dist. Amravati affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 1: Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati established in year 1993 which offers undergraduate courses in Arts, Commerce and Science. The college is accredited with 'B' Grade by NAAC with CGPA 2.36. The college is having qualified staff and experts in various subjects of all the three faculties, i.e. Art, Commerce and Science. The college is affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 2: Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji. Dist. Amravati. A multi Faculty grant-in-aid institution offering UG, PG, & Ph.D. program , affiliated to Sant Gadge Baba Amravati University, Amravati was started by Shri. Sarda Education Society vision to make higher education available to the under privileged section of society approximately anjangao surji. It has 3 major streams – Art's, Commerce & Science with a distance mode center of YCMU nashik & H.S.C. (VOC) competent ,efficient dedicated and well qualified staff with the highest academic degree a far-sighted visionary management and good infrastructure have contribute to making excellent center of higher education keeping in mind contemporary global and national contacts, the college strives continuously to make success a way of life not only in academic but also in extracurricular activities. It has always been the prime focus of the college to provide the students the best possible ambience for learning and personality development. Today the college is recognized as a one of the well known center of higher education in this rural area of Amravati district.

PURPOSE:

The propose of this Memorandum of Understanding is to continue and expand a framework of co-operation between **Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602** and Department of Home- Economics, **Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji. Dist. Amravati.**to develop mutually beneficial programs, a academic literature and activities.

OBJECTIVES:

Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli, Dist. Amravati 444602 and Department of Home- Economics, have mutually agreed to co-operate with each other in following areas.

1. To provide platform for collaborative research activities.
2. To organize extension activities for the benefit of local committees.
3. To organize the Guest Lectures series for the students and faculty members on the topic of mutual benefits.
4. To organize collaborative Workshops/Conferences/Symposia.
5. Strengthening of teaching and learning process by exchange of faculty.

6. To develop a academic literature such as books, notes , study guides etc. for the students of home – economics .

TERMS AND CONDITIONS:

- The details for the efficacious implementation of this Memorandum of Understanding shall be jointly worked out on mutually acceptable terms within the parameters of the policies, rules and regulations of both the institutions.
- The parties to this memorandum may, by mutual consent, adds, modify, amend, delete, review or revise any term (s) and condition (s) of this agreement.
- The parties to this Memorandum of Understanding undertake to treat as CONFIDENTIAL AND PRIVILEGED information of the other institution, which is so classified in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.
- This Memorandum of Understanding shall require the rectification of the competent academic or executive body of both the institution.
- Either party can terminate the Memorandum of Understanding after giving one month's notice to the other party subject to fulfillment of commitments already agreed upon.
- The Memorandum of Understanding shall be reviewed at the end of every academic year.
- Any dispute arising out of this Memorandum of Understanding will be settled by mutual negotiations between the two parties.
- There will be no financial liabilities and obligations for both the organizations.
- Both the organizations will appoint a person to serve as the official contact and co-ordinate the activities of each organization in carrying out this Memorandum of Understanding.

The appointees of each organization are

a) Dr. K. R. Belukar
Assistant Professor and Head,
Department of Home- Economics ,
M.J.F. Com., Sci. and V.R. Arts College, Bhatkuli
Mob. No.: +91 9764812391

b) Dr. S.A. Jawanjal
Asso. Professor and Head, Dept. of Home-Economics ,
Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji.
Mobile No.: +91 9766333927

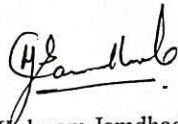
- The Memorandum of Understanding will remain valid for the period of 5 years on the date it is signed by the parties.

Signed at Bhatkuli on this the day of 15 / 11 / 2017

Authorized signatory on behalf of Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli.

Authorized signatory on behalf of Smt.Radhabai Sarda Art's,Science & Commerce College Anjangao Surji.

Signature:



Name: Dr. Kaluram Jamdhade
Principal

Seal:



Date:
Email Id: principal.bhatkuli@gmail.com
Website: <https://mjfbhatkuli.org/>
Mob. No.: +91 9921559789

Signature:





Name: Dr. Radhabai Sarda
Principal
Smt. Radhabai Sarda College
of Arts, Science & Commerce
Anjangao Surji

Seal:



Date:
Email ID.: smrscollge@gmail.com
Website: <http://www.rscollge.ac.in>
Mob. No.: 9423696043

WITNESSES:

S.N.	Name	Organization	Designation	Signature
1.	Dr. Anita Tidake	Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli.	Assistant Professor	
2.	Dr. Satendra Gadpalle	Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji.	Assistant Professor	

Shri Sarda Education Society (Trust)'s
(A Linguistic Minority Educational Institute)

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE
ANJANGAON SURJI- 444705, DIST- AMRAVATI (Maharashtra)

(Affiliated to Sant Gadge Baba Amravati University, Amravati)

DR BASHISTH CHOUBEY

MA., PhD

Principal Fax: 295678

Cell No.: 9423853815

College: 9423696043



STD Code: 07224

Office: 295678

Website: www.rscollege.ac.in

E-mail: smtrscollege@gmail.com

**MEMORANDUM
OF
UNDERSTANDING**

**BETWEEN
SMT. RADHABAI SARDA ART'S, SCIENCE & COMMERCE COLLEGE ANJANGAO
SURJI, DIST. AMRAVATI.**

**AND
MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT ARTS
COLLEGE, BHATKULI**

INTRODUCTION:

This Memorandum of Understanding is hereby made and entered into by and between Department of Home Economics, Smt. Radhabai Sarda Art's, Science & Commerce College Anjangao Surji. Dist. Amravati and Department of Home- Economics MAHATMA JYOTIBA FULE COMMERCE, SCIENCE AND VITTHALRAO RAUT ARTS COLLEGE, BHATKULI, 444602 DIST. AMRAVATI affiliated to Sant Gadge Baba Amravati University, Amravati.

Partner 1: Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji. Dist. Amravati. A multi Faculty grant-in-aid institution offering UG, PG, & Ph.D. program, affiliated to Sant Gadge Baba Amravati University, Amravati was started by Shri. Sarda Education Society vision to make higher education available to the under privileged section of society approximately anjangao surji. It has 3 major streams – Art's, Commerce & Science with a distance mode center of YCMU nashik & H.S.C. (VOC) competent, efficient, dedicated and well qualified staff with the highest academic degree a far-sighted visionary

management and good infrastructure have contribute to making excellent center of higher education keeping in mind contemporary global and national contacts, the college strives continuously to make success a way of life not only in academic but also in extracurricular activities. It has always been the prime focus of the college to provide the students the best possible ambience for learning and personality development. Today the college is recognized as a one of the well known center of higher education in this rural area of Amravati district.

5. Strengthening of teaching and learning process by exchange of faculty.
6. To develop a academic literature such as books, notes , study guides etc. for the students of home – economics .

TERMS AND CONDITIONS:

- The details for the efficacious implementation of this Memorandum of Understanding shall be jointly worked out on mutually acceptable terms within the parameters of the policies, rules and regulations of both the institutions.
- The parties to this memorandum may, by mutual consent, adds, modify, amend, delete, review or revise any term (s) and condition (s) of this agreement.
- The parties to this Memorandum of Understanding undertake to treat as CONFIDENTIAL AND PRIVILEGED information of the other institution, which is so classified in advance. The terms of confidentiality and mode of disclosure shall be as per mutually acceptable terms.
- This Memorandum of Understanding shall require the rectification of the competent academic or executive body of both the institution.
- Either party can terminate the Memorandum of Understanding after giving one month's notice to the other party subject to fulfillment of commitments already agreed upon.
- The Memorandum of Understanding shall be reviewed at the end of every academic year.
- Any dispute arising out of this Memorandum of Understanding will be settled by mutual negotiations between the two parties.
- There will be no financial liabilities and obligations for both the organizations.
- Both the organizations will appoint a person to serve as the official contact and co-ordinate the activities of each organization in carrying out this Memorandum of Understanding.

The appointees of each organization are

a) Dr. S.A. Jawanjal
Asso. Professor and Head, Dept. of Home-Economics ,
Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji.
Mobile No.: +91 9766333927

b)) Dr. K. R. Belukar
Assistant Professor and Head,
Department of Home- Economics ,
M.J.F. Com., Sci. and V.R. Arts College, Bhatkuli
Mob. No.: +91 9764812391

- The Memorandum of Understanding will remain valid for the period of 5 years on the date it is signed by the parties.

Signed at Bhatkuli on this the day of ____ / ____ / 20

Authorized signatory on behalf of Smt.Radhabai
Sarda Art's,Science & Commerce College
Anjangao Surji.

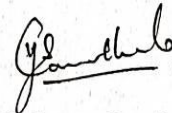
Authorized signatory on behalf of Mahatma
Jyotiba fule Commerce, Science & Vitthalrao Raut
Art's College, Bhatkuli

Signature:


Principal

Name: Dr. Bashishth Choubey
Principal
Smt. Radhabai Sarda College
Of Arts, Commerce & Science
Anjangaon Surji

Signature:



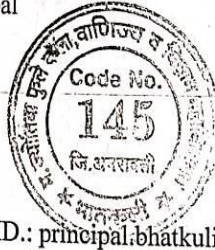
Name: Dr. Kaluram Jamdhade
Principal

Seal:



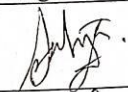

Date:
Email ID.: smtcollege@gmail.com
Website: <http://www.rscollge.ac.in>
Mob. No.: 9423696043

Seal:



Date:
Email ID.: principal.bhatkuli@gmail.com
Website: <http://www.mjfbhatkuli.org.in>
Mob. No.: 9921559789

WITNESSES:

S.N.	Name	Organization	Designation	Signature
1	Dr. Satendra Gadpaile	Smt. Radhabai Sarda Art's, Science & Commerce College, Anjangao Surji.	Assistant Professor	
2..	Dr. Anita Tidake	Mahatma Jyotiba Fule Commerce, Science and Vitthalrao Raut Arts College, Bhatkuli.	Assistant Professor	

विद्यया ऽ मृतमश्नुते

मानवी विकास

भाग २



डॉ. संगीता जवंजाल
डॉ. किरण बेलूरकर



श्री साईनाथ प्रकाशन, नागपूर

संत गाडगेबाबा अमरावती विद्यापीठ आणि राष्ट्रसंत तुकडोजी महाराज
नागपूर विद्यापीठाच्या बी.ए. भूग ३, सत्र-६ च्या
नवीन अभ्यासक्रमानुसार
महाराष्ट्रातील सर्व विद्यापीठांना उपयुक्त

मानवी विकास (Human Development)

डॉ. संगीता आ. जवंजाल

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

श्रीमती राधाबाई सारडा कला,

वाणिज्य व विज्ञान महाविद्यालय,

अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान

व विठ्ठलराव राऊत कला महाविद्यालय,

भातकुली

श्री साईनाथ प्रकाशन, नागपूर

१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर-४४० ०१०

प्रकाशन क्र. ३७६

मानवी विकास

ISBN -978-93-84642-37-2

प्रकाशक

ललिता पुराणिक

श्री साईनाथ प्रकाशन

१, भगवाघर कॉम्प्लेक्स,

धरमपेठ, नागपूर-४४० ०१०

फोन - (०७१२) २५२४४९८, ९८८१७१८२२४

पहिली आवृत्ती - १ जानेवारी २०२०

लेखिका

डॉ. संगीता आ. जवंजाळ

डॉ. किरण रा. बेलूरकर

अक्षर जुळवणी

सौ. संगीता दांदडे

मुखपृष्ठ

डॉ. भाऊ दांदडे

मुद्रक

सुविचार प्रकाशन मंडळ,

नागपूर

किंमत - १५०/- रुपये

अनुक्रमणिका

घटक १ - अनुवंशिकता आणि चातावरण

- १.१ अनुवंशिकतेचा अर्थ
- १.१.२ आनुवंशिकतेचे नियम
- १.२ बालकाच्या विकासात अनुवंशिकतेचे महत्त्व
- १.३ बालकाच्या विकासात चातावरणाची भूमिका
- १.४ बालकाच्या विकासात कुटुंबाची भूमिका
- १.४.१ बालकाच्या विकासात संयुक्त कुटुंबाची भूमिका
- १.४.२ बालकाच्या विकासात विभक्त कुटुंबाची भूमिका

घटक २ - व्यक्तिमत्त्व विकास

- २.१ व्यक्तिमत्त्व अर्थ व व्याख्या
- २.१.१ व्यक्तिमत्त्वाचे प्रकार
- २.१.२ व्यक्तिमत्त्व विकासावर परिणाम करणारे घटक
- २.२ सुरक्षा यंत्रणा - अर्थ व व्याख्या
- २.२.१ सुरक्षा यंत्रणेचे प्रकार
- २.३ स्वसंकल्पना - अर्थ व व्याख्या
- २.३.१ स्वसंकल्पनेचे प्रकार

घटक ३ - नेतृत्व

- ३.१ नेतृत्व - अर्थ व व्याख्या
- ३.१.१ नेतृत्वाचे प्रकार
- ३.१.२ नेतृत्वाकरीता आवश्यक गुण
- ३.२ बाल्यावस्थेतील वर्तन समस्या
- ३.३ लैंगिक शिक्षणाची गरज आणि महत्त्व
- ३.४ अपंग बालक - अर्थ व व्याख्या
- ३.४.१ अपंगत्वाचे प्रकार
- ३.४.२ अपंग बालकाच्या शैक्षणिक समस्या

घटक ४ - किशोरावस्था

- ४.१ किशोरावस्थेतील विकासात्मक कार्य
- ४.२ किशोरावस्थेतील शारीरिक बदल
- ४.२.१ किशोरावस्थेतील भावनात्मक बदल
- ४.३ किशोरवयीन बालकांच्या सवयी
- ४.४ पालकाची सकारात्मक भूमिका
- ४.५ शिक्षकांची सकारात्मक भूमिका

घटक ५ - पालक-बालक संबंध

१. पालकत्वाचे महत्त्व आणि प्रकार
२. पालक-बालक संबंध व महत्त्व
३. बालसंगोपन पद्धती
४. पालक-बालक संबंधाचा बालकाच्या व्यक्तिमत्त्व विकासावर परिणाम
५. पालकासमोरील आव्हाने
 - ५.४.१ दूरचित्रवाणीचा प्रभाव
 - ५.४.२ जंकफुड / फास्टफुडचा प्रभाव
 - ५.४.३ सामाजिक प्रसारमाध्यमांचा प्रभाव
- अ) सत्रकार्य - १. सेमिनार २. कार्यक्रमाचे व्यवस्थापन
- ब) प्रात्यक्षिके
 १. पूर्वशालेय बालकांकरिता आहार आयोजन
 १. सॅण्डविच २. शेंगदाण्याची चिक्की
 ३. मिक्स लाडू ४. पालकपुरी
 २. शालेय बालकांकरिता आहार आयोजन
 १. रव्याचा केक २. अप्पे आणि चटणी
 ३. चिरवंट ४. मिक्स दालवडा
 ३. किशोरवयीन मुलांकरिता आहार आयोजन
 १. ढोकळा २. पनीर टिक्की ३. पावभाजी ४. मुगाचा हलवा
- क) ड्राफ्टिंग व स्टिचिंग
 १. पंजाबी कुर्ता २. सलवार ३. नाईटी

मानवी विकास

डॉ. संगीता जवंजाल

डॉ. किरण बेलूरकर



श्री साईनाथ प्रकाशन, नागपूर

Prof. Dr. K.R. Belurkar

श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स,
धरमपेठ, नागपूर-१०

संत गाडगेबाबा अमरावती विद्यापीठ आणि राष्ट्रसंत तुकडोजी महाराज
नागपूर विद्यापीठाच्या बी.ए.भाग ३, सत्र-५ च्या
नवीन अभ्यासक्रमानुसार
महाराष्ट्रातील सर्व विद्यापीठांना उपयुक्त

मानवी विकास (Human Development)

डॉ. संगीता आ. जवंजाळ

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

श्रीमती राधाबाई सारडा कला,

वाणिज्य व विज्ञान महाविद्यालय,

अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान

व विठ्ठलराव राऊत कला महाविद्यालय,

भातकुली

श्री साईनाथ प्रकाशन, नागपूर

१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर-४४० ०१०

प्रकाशन क्र. ३५६

मानवी विकास

ISBN -978-93-84642-85-3

प्रकाशक

ललिता पुराणिक

श्री साईनाथ प्रकाशन

१, भगवाघर कॉम्प्लेक्स,

धरमपेठ, नागपूर-४४० ०१०

फोन - (०७१२) २५२४४९८, ९८८१७१८२२४

पहिली आवृत्ती - ३० जून २०१९

लेखिका

डॉ. संगीता आ. जवंजाळ

डॉ. किरण रा. बेलूरकर

अक्षर जुळवणी

सौ. संगीता दांदडे

मुखपृष्ठ

डॉ. भाऊ दांदडे

मुद्रक

सुविचार प्रकाशन मंडळ,

नागपूर

किंमत - २००/- रुपये

अनुक्रमणिका

घटक	पृष्ठ क्र.
१. मानवी विकास	१-२८
१.१ मानव विकासाचा अर्थ व व्याख्या	
१.१.१ मानवी विकासाच्या अध्ययनाचे महत्त्व	
१.२ विकासाच्या अवस्था	
१.२.१ विकासात्मक कार्य	
१.२.२ वैकासिक कार्यांच्या अध्ययनाचे महत्त्व	
१.२.३ विविध अवस्थानुसार वैकासिक कार्य	
१.३ विकासाची तत्त्वे	
१.३.१ वाढ व विकासावर परिणाम करणारे घटक	
१.४ जन्मपूर्व विकासाच्या अवस्था	
२. प्रजनन संस्था	२९-५५
२.१ प्रजनन संस्था	
२.१.१ पुरुष प्रजनन संस्था,	
२.१.२ स्त्री प्रजनन संस्था	
२.२ लिंगनिश्चिती	
२.१.१ जुळी मुले	
२.१.२ अपरिपक्व बालक - काळजी व कारणे	
२.३ स्तनपानाचे महत्त्व	
२.३.१ कृत्रिम पोषण	
२.४ लहान मुलांना होणारे आजार	
२.४.१ अतिसार	
२.४.२ कावीळ	
२.४.३ घटसर्प	
२.४.४ डांग्या खोकला	
२.५ लसीकरण	

३. कारक विकास

५६-९२

- ३.१ कारक विकास - अर्थ व व्याख्या
 - ३.१.१ बालकाच्या जीवनात कारक विकासाचे महत्त्व
 - ३.२.२ कारक विकासाचा क्रम
 - ३.२.३ कारक कौशल्य
 - ३.२.४ कारक कौशल्य आत्मसात करण्याच्या पद्धती
- ३.२ कारक विकासावर परिणाम करणारे घटक
- ३.३ शारीरिक विकास - अर्थ व व्याख्या
 - ३.३.१ शारीरिक विकासातील प्रमाणबद्धता
 - ३.३.२ विविध अवयवांचा विकास
- ३.४ खेळ - अर्थ व व्याख्या
 - ३.४.१ खेळाचे मूल्य
 - ३.४.२ खेळाचे प्रकार
- ३.५ सामाजिक समायोजन

४. नैतिक विकास

९३-११५

- ४.१. बौद्धिक विकास - अर्थ व व्याख्या
 - ४.१.१ बुद्धिचे प्रकार
 - ४.१.२ बुद्ध्यांक
 - ४.२.२ बौद्धिक विकासावर परिणाम करणारे घटक
- ४.३ भाषा विकास - अर्थ व व्याख्या
 - ४.३.१ भाषा विकासाचे महत्त्व
 - ४.३.२. भाषापूर्व विकास
 - ४.३.३ भाषाविकासाच्या पायऱ्या
 - ४.३.४ भाषाविकासावर परिणाम करणारे घटक
- ४.४ भाषादोष

५. सामाजिक विकास	११६-१६३
५.१ सामाजिक विकास - अर्थ व व्याख्या	
५.१.१ सामाजिकरणाच्या अवस्था	
५.१.२ सामाजिक विकासाच्या अवस्था	
५.१.३ सोबती किंवा सहचर	
५.१.४ खेळातील सवंगडी	
५.२ भावनिक विकास - अर्थ व व्याख्या	
५.२.१ बालकाच्या जीवनात भावनेचे महत्त्व	
५.२.२ विविध अवस्थेनुसार भावनिक विकास	
५.२.३ बालकाच्या भावनेची वैशिष्ट्ये	
५.२.४ भावनेचे प्रकार	
५.३ नैतिक विकास	
५.३.१ विविध अवस्थांतील नैतिक विकास	
५.३.२ नैतिक शिक्षणाच्या पद्धती	
५.३.३ नैतिक विकासावर परिणाम करणारे घटक	
५.४ शिस्त - अर्थ व व्याख्या	
५.४.१ बालकाच्या जीवनात शिस्तीचे महत्त्व	
५.४.२ शिस्तीचे प्रकार	
५.४.३ शिस्तीचे फायदे	
५.४.४ शिस्तीचे तोटे	
५.४.५ शिस्त लावण्याची तंत्रे	
प्रात्यक्षिके	१६३-१७२
प्रश्नसंच	१७३-१७६
संदर्भ ग्रंथ सूची	१७७-१७८



बाल विकास

(Child Development)

डॉ. संगीता जवंजाळ

डॉ. किरण बेलूरकर

श्री साईनाथ प्रकाशन, नागपूर

श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स,
धरमपेठ, नागपूर-१०

महाराष्ट्रातील सर्व विद्यापीठांना उपयुक्त
आणि सामान्य वाचकांसाठी

बाल विकास (Child Development)

डॉ. संगीता आ. जवंजाळ

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

श्रीमती राधाबाई सारडा कला,

वाणिज्य व विज्ञान महाविद्यालय,

अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान

व विठ्ठलराव राऊत कला महाविद्यालय,

भातकुली

श्री साईनाथ प्रकाशन, नागपूर

१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर-४४० ०१०

प्रकाशन क्र. ३५६

बाल विकास

ISBN -978-93-84642-85-3

प्रकाशक

ललिता पुराणिक

श्री साईनाथ प्रकाशन

१, भगवाघर कॉम्प्लेक्स,

धरमपेठ, नागपूर-४४० ०१०

फोन - (०७१२) २५२४४९८, ९८८१७१८२२४

पहिली आवृत्ती - ३० जून २०१९

लेखिका

डॉ. संगीता आ. जवंजाळ

डॉ. किरण रा. बेलूरकर

अक्षर जुळवणी

सौ. संगीता दांदडे

मुखपृष्ठ

डॉ. भाऊ दांदडे

मुद्रक

सुविचार प्रकाशन मंडळ,

नागपूर

किंमत - २००/- रुपये

अनुक्रमणिका

घटक	पृष्ठ क्र.
१. मानवी विकास	१-२८
१.१ मानव विकासाचा अर्थ व व्याख्या	
१.१.१ मानवी विकासाच्या अध्ययनाचे महत्त्व	
१.२ विकासाच्या अवस्था	
१.२.१ विकासात्मक कार्य	
१.२.२ वैकासिक कार्यांच्या अध्ययनाचे महत्त्व	
१.२.३ विविध अवस्थानुसार वैकासिक कार्य	
१.३ विकासाची तत्त्वे	
१.३.१ वाढ व विकासावर परिणाम करणारे घटक	
१.४ जन्मपूर्व विकासाच्या अवस्था	
२. प्रजनन संस्था	२९-५५
२.१ प्रजनन संस्था	
२.१.१ पुरुष प्रजनन संस्था,	
२.१.२ स्त्री प्रजनन संस्था	
२.२ लिंगनिश्चिती	
२.१.१ जुळी मुले	
२.१.२ अपरिपक्व बालक - काळजी व कारणे	
२.३ स्तनपानाचे महत्त्व	
२.३.१ कृत्रिम पोषण	
२.४ लहान मुलांना होणारे आजार	
२.४.१ अतिसार	
२.४.२ कावीळ	
२.४.३ घटसर्प	
२.४.४ डांग्या खोकला	
२.५ लसीकरण	

३. कारक विकास

५६-९२

३.१ कारक विकास - अर्थ व व्याख्या

३.१.१ बालकाच्या जीवनात कारक विकासाचे महत्त्व

३.२.२ कारक विकासाचा क्रम

३.२.३ कारक कौशल्य

३.२.४ कारक कौशल्य आत्मसात करण्याच्या पद्धती

३.२ कारक विकासावर परिणाम करणारे घटक

३.३ शारीरिक विकास - अर्थ व व्याख्या

३.३.१ शारीरिक विकासातील प्रमाणबद्धता

३.३.२ विविध अवयवांचा विकास

३.४ खेळ - अर्थ व व्याख्या

३.४.१ खेळाचे मूल्य

३.४.२ खेळाचे प्रकार

३.५ सामाजिक समायोजन

४. नैतिक विकास

९३-११५

४.१. बौद्धिक विकास - अर्थ व व्याख्या

४.१.१ बुद्धिचे प्रकार

४.१.२ बुद्ध्यांक

४.२.२ बौद्धिक विकासावर परिणाम करणारे घटक

४.३ भाषा विकास - अर्थ व व्याख्या

४.३.१ भाषा विकासाचे महत्त्व

४.३.२. भाषापूर्व विकास

४.३.३ भाषाविकासाच्या पायऱ्या

४.३.४ भाषाविकासावर परिणाम करणारे घटक

४.४ भाषादोष

११६-१६३

५. सामाजिक विकास
- ५.१ सामाजिक विकास - अर्थ व व्याख्या
- ५.१.१ सामाजिकरणाच्या अवस्था
- ५.१.२ सामाजिक विकासाच्या अवस्था
- ५.१.३ सोबती किंवा सहचर
- ५.१.४ खेळातील सवंगडी
- ५.२ भावनिक विकास - अर्थ व व्याख्या
- ५.२.१ बालकाच्या जीवनात भावनेचे महत्त्व
- ५.२.२ विविध अवस्थेनुसार भावनिक विकास
- ५.२.३ बालकाच्या भावनेची वैशिष्ट्ये
- ५.२.४ भावनेचे प्रकार
- ५.३ नैतिक विकास
- ५.३.१ विविध अवस्थांतील नैतिक विकास
- ५.३.२ नैतिक शिक्षणाच्या पद्धती
- ५.३.३ नैतिक विकासावर परिणाम करणारे घटक
- ५.४ शिस्त - अर्थ व व्याख्या
- ५.४.१ बालकाच्या जीवनात शिस्तीचे महत्त्व
- ५.४.२ शिस्तीचे प्रकार
- ५.४.३ शिस्तीचे फायदे
- ५.४.४ शिस्तीचे तोटे
- ५.४.५ शिस्त लावण्याची तंत्रे

प्रात्यक्षिके

१६३-१७२

प्रश्नसंच

१७३-१७६

संदर्भ ग्रंथ सूची

१७७-१७८

Sarda Education Society (Trust)'s
(A Linguistic Minority Educational Institute)

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE

ANJANGAON SURJI- 444705, DIST- AMRAVATI (Maharashtra)

(Affiliated to Sant Gadge Baba Amravati University, Amravati)

DR BASHISTH CHOUBEY

MA., PhD

Principal

Cell No.:

Personal : 9423853815



STD Code : 07224

Office : 242010/242011

Fax : 242010

Website: www.rscollege.ac.in

E-mail: smtrscollege@gmail.com

प्रमाणपत्र

डॉ किरण राजेंद्र बेलूरकर , सहयोगी प्राध्यापक, महात्मा फुले महाविद्यालय, भातकुली, जिल्हा: अमरावती यांनी आमच्या महाविद्यालयात आयोजित केलेल्या पोषण संबंधित कार्यक्रम अंतर्गत जनजागृती कार्यक्रमात दिनांक 21 /12/2019 शनिवार रोजी आहारोपचार या विषयावर मार्गदर्शन केले आणि त्यांचे अनेक कार्यक्रमात संस्थेला सहकार्य सतत लाभत असते करिता त्यांना प्रमाणपत्र देताना आनंद होत आहे .

Date: 23rd December 2020

Bem

Principal





मानवी पोषण आणि आहारशास्त्र

डॉ. संगीता जवंजाळ

डॉ. किरण बेलूरकर



राष्ट्रीय आहारशास्त्र

संत गाडगेबाबा अमरावती विद्यापीठ आणि राष्ट्रसंत तुकडोजी महाराज
नागपूर विद्यापीठाच्या बी.ए. भाग २, सत्र - ३च्या अभ्यासक्रमानुसार

मानवी पोषण व आहारशास्त्र

डॉ. संगीता आ. जवंजाळ (निपाणे)

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

श्रीमती राधाबाई सारडा कला,

वाणिज्य व विज्ञान महाविद्यालय,

अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान

व विठ्ठलराव राजत कला महाविद्यालय,

भातकुली

श्री साईनाथ प्रकाशन, नागपूर

१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर-४४० ०१०

प्रकाशन क्र. ३२८
मानवी पोषण व आहारशास्त्र
ISBN -978-93-84642-60-0

प्रकाशक
ललिता पुराणिक
श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स,
धरमपेठ, नागपूर-४४० ०१०
फोन - (०७१२) २५२४४९८, ९८८१७३८२२४
पहिली आवृत्ती - २७ जून २०१८

लेखिका
डॉ. संगीता आ. जवंजाळ
डॉ. किरण रा. बेलूरकर

अक्षर जुळवणी
सौ. संगीता दांदडे

मुखपृष्ठ
डॉ. भाऊ दांदडे

मुद्रक
सुविचार प्रकाशन मंडळ, नागपूर

किंमत - रुपये २५०/-

अनुक्रमणिका

१.	आहारशास्त्र व पोषण	१-१५
१.१	अन्न आणि पोषण	
१.२	परिभाषा	
	१.२.१ अन्न	
	१.२.२ आरोग्य	
	१.२.३ कुपोषण	
	१.२.४ आहाराचा स्तर	
	१.२.५ अन्नघटक	
	१.२.६ पोषण	
१.३	आहार व आरोग्य संबंध	
१.४	अन्नाची कार्ये	
२.	शक्तीउत्पादक घटक	१६-४१
२.१	स्निग्ध पदार्थ	
२.२	कर्बोदके	
२.३	तृणधान्य	
२.४	तेल व तेलबिया	
२.५	दूध आणि दुधाचे पदार्थ	
३.	शरीरनिर्माणक पोषक घटक	४२-५९
३.१	प्रथिने	
३.२	डाळी आणि कडधान्य	
३.३	अंडी	
३.४	मास, मासे व खाद्यपक्षी	

४. संरक्षक आणि नियंत्रक पोषक घटक ६०-१२३
- ४.१ जीवनसत्त्वे
- ४.१.१ स्निग्धद्राव्य जीवनसत्त्वे
- ४.१.२ जलद्राव्य जीवनसत्त्वे
- ४.२ खनिजपदार्थ
- ४.२.१ कॅल्शियम
- ४.२.२ फॉस्फरस
- ४.२.३ सोडियम क्लोराईड
- ४.२.४ लोह
- ४.२.५ आयोडीन
- ४.२.६ तांबे
- ४.३ आहारातील फळे व भाज्यांचे महत्त्व
- ४.३.१ आहारातील भाज्यांचे महत्त्व
- ४.३.२ आहारातील फळांचे महत्त्व
- ४.४ पाणी
५. समतोल आहार १२४-१६१
- ५.१ समतोल आहाराचा अर्थ व महत्त्व
- ५.२ समतोल आहारावर परिणाम करणारे घटक
- ५.३ आहार आयोजनाची तत्त्वे
- ५.४ विविध अवस्थानुसार आहार आयोजन
- ५.४.१ गर्भवती स्त्रीकरीता आहार नियोजन
- ५.४.२ दुग्धसृजन काळातील स्त्रीकरीता आहार आयोजन
- ५.४.३ बाल्यावस्थेतील मुलांकरीता आहार आयोजन
- ५.४.४ किशोरावस्थेतील मुलांकरीता आहार आयोजन

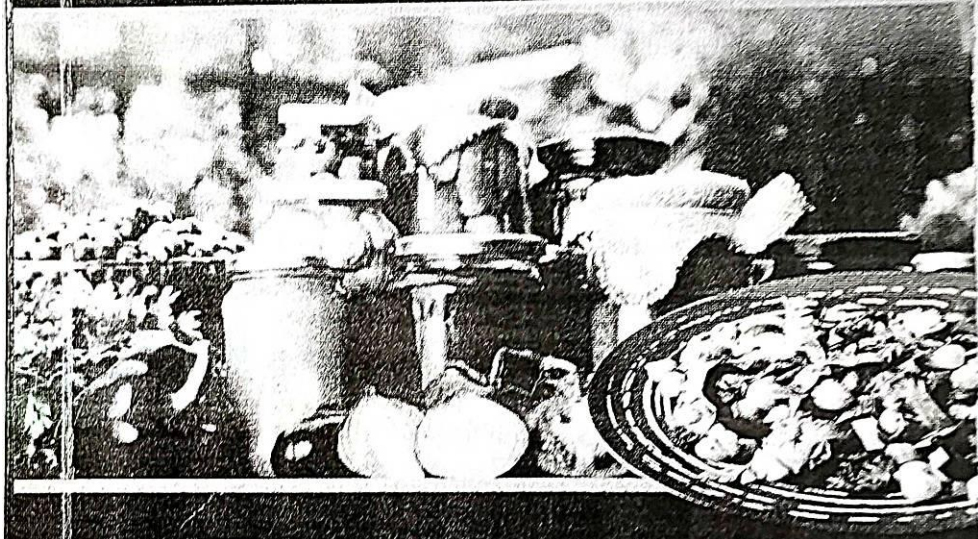
प्रात्यक्षिके (Practical's) अनुक्रमणिका

- अ) वजन आणि मापे (Weights and Measures) १६२-२०६
- ब) प्रात्यक्षिक (Demonstration)
१. लोणचे (Pickles) २. मसाले (Masale) ३. ग्रेव्ही (Gravies)
४. प्रांतीय आहार -
- दाक्षिणात्य पदार्थ - १) उत्तप्पा २) सांबार वडा
- महाराष्ट्रीयन आहार - पुडाची वडी
- गुजराथी पदार्थ - दहीवडा
- पंजाबी पदार्थ - छोले भटुरे
- बंगाली पदार्थ - गुलाब जामून
- अ) सत्रकार्य १. उद्योग/गृहउद्योग/मॉल/बाजारपेठ/दुकान
यांना भेट (कोणतेही १)
२. गटप्रकल्प
- ब) वर्गकाम १. जागतिक पोषण सप्ताह साजरा करणे व अहवाल लेखन
२. स्वतःच्या आहाराचे मुल्यांकन (१ आठवडा)
- प्रश्नसंच २०७-२०९
- संदर्भग्रंथ सूची २१०-२११

मानवी पोषण
सत्र ४

मानवी पोषण आणि आहारशास्त्र

डॉ. संगीता जवंजाल
डॉ. किरण बेलूरकर



श्री साईनाथ प्रकाशन, नागपूर

संत गाडगेबाबा अमरावती विद्यापीठ आणि राष्ट्रसंत तुकडोजी महाराज
नागपूर विद्यापीठाच्या बी.ए. भाग २, सत्र - ४च्या अभ्यासक्रमानुसार

मानवी पोषण व आहारशास्त्र

डॉ. संगीता आ. जवंजाळ (निपाणे)

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

श्रीमती राधाबाई सारडा कला,

वाणिज्य व विज्ञान महाविद्यालय,

अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर

एम.ए. (गृहअर्थशास्त्र)

एम.फिल., पीएच.डी.

सहयोगी प्राध्यापक, विभागप्रमुख

महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान

व विठ्ठलराव राजत कला महाविद्यालय,

भातकुली

श्री साईनाथ प्रकाशन, नागपूर

१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर-४४० ०१०

प्रकाशन क्र. ३४९
मानवी पोषण व आहारशास्त्र
ISBN -978-93-84642-60-0

प्रकाशक
ललिता पुराणिक
श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स,
धरमपेठ, नागपूर-४४० ०१०
फोन - (०७१२) २५२४४९८, ९८८१७९८२२४
पहिली आवृत्ती - १० डिसेंबर २०१८

लेखिका
डॉ. संगीता आ. जवंजाळ
डॉ. किरण रा. बेल्लूरकर
अक्षर जुळवणी
सौ. संगीता दांदडे

मुखपृष्ठ
डॉ. भाऊ दांदडे

मुद्रक
प्रिंट सोल्युशन,
नागपूर

किंमत - १७५/- रुपये

अनुक्रमणिका

घटक	पृष्ठ क्र.
१. आहारशास्त्र व पोषण	१
१.१ परिभाषा	
१.१.१ आहार नियमन शास्त्र	
१.१.२. आहारतज्ज्ञ	
१.१.३ आहारोपचार	
१.२ आहारोपचाराचे उद्देश आणि तत्त्वे	
१.२.१ आहारोपचाराचे उद्देश	
१.२.२ आहारोपचाराची तत्त्वे	
१.३ आहारोपचाराचे प्रकार व आहारतज्ज्ञाची भूमिका	
१.३.१ आहारोपचाराचे प्रकार	
१.३.२ आहारतज्ज्ञाची भूमिका	
१.४ राष्ट्रीय व आंतरराष्ट्रीय संस्था	
१.४.१ राष्ट्रीय संस्था (NIN)	
१. राष्ट्रीय पोषण संस्था (NIN)	
१.४.२ आंतरराष्ट्रीय संस्था	
१. जागतिक आरोग्य संघटना (WHO)	
२. संयुक्त राष्ट्र बालनिधी (UNICEF)	
३. अन्न कृषी संघटना (FAO)	
२. आजारपणातील आहारोपचार	१९
२.१ पचनसंस्थेशी संबंधित आजार	
अ) बद्धकोष्ठता ब) अँसिडीटी क) रक्तक्षय	
२.२ यकृताशी संबंधित आजार	
अ. काविल	
२.३ स्वादुपिंडाशी संबंधित आजार	
अ. मधुमेह	
२.४ हृदयरोग हृदयाशी संबंधित आजार	
अ. हृदय रोग	

३. अन्न शिजविणे

- ३.१ अन्न शिजविणे अर्थ व व्याख्या
- ३.१.१ अन्न शिजविण्याचे महत्त्व
- ३.२.२ अन्न शिजविण्याची उद्दिष्टे
- ३.२ अन्न शिजविण्याची पद्धती
- ३.२.१ अन्न शिजविण्याच्या पारंपरिक पद्धती
- ३.२.२ अन्न शिजविण्याच्या आधुनिक पद्धती
- ३.३ अन्न शिजविण्याचे फायदे
- ३.४ अन्न शिजविण्याची प्रक्रिया-पूर्वतयारी
- ३.४.१ अन्नाची पोषण गुणवत्ता वाढविणे

४. अन्नसंरक्षण

- ४.१. अन्न संरक्षणाच्या व्याख्या
- ४.२. अन्न संरक्षणाची उद्दिष्टे
- ४.३ अन्न संरक्षणाचे सिद्धान्त किंवा तत्त्वे
- ४.४ अन्न संरक्षणाच्या पद्धती
- ४.४.१ अन्न संरक्षणाच्या घरगुती पद्धती
- ४.५ अन्न संरक्षणाच्या व्यापारी पद्धती

५. अन्न दुषितीकरण किंवा अन्न खराब होणे

- ५.१.१ अन्न दुषितीकरणाचा अर्थ व व्याख्या
- ५.१.२ अन्न दुषित होण्याची कारणे
- ५.२ अन्नभेसळ
- ५.२.१ अन्न भेसळीचा अर्थ व व्याख्या
- ५.२.२ अन्न भेसळीची कारणे
- ५.२.३ अन्न भेसळीचे मानवी जीवनावर होणारे दुष्परिणाम
- ५.३ अन्न भेसळ ओळखणे
- ५.३.१ अन्न भेसळ ओळखण्याकरिता वापरण्यात येणारी परिक्षणे
- ५.३.२ अन्न भेसळ कमी करण्यासाठी घ्यावयाची दक्षता
- ५.४ अन्न भेसळ प्रतिबंधक कायदे

४५ सत्रकार्य

१. आहारआयोजन १०१
 अ. आहारोपचारात्मक आहारतालिका
 ब. विक्री व व्यवस्थापन करण्याच्या दृष्टिकोनातून टिकाऊ पदार्थ तयार करणे.
 २. स्थानिक पदार्थापासून उच्चभोज्ययुक्त पदार्थ बनविणे

प्रात्यक्षिके

१०८

- प्रात्यक्षिक १. वजन व मापे
 प्रात्यक्षिक २. अन्नसंरक्षण
 २.१ कृत्रिम सरबते आणि नैसर्गिक सरबते
 २.२ आरोग्यवर्धक पेय
 २.३ सूपचे विविध प्रकार
 प्रात्यक्षिक ३. उच्च भोज्यघटक असणारे पदार्थ
 ३.१ जीवनसत्व 'अ' प्राप्तीसाठी पदार्थ
 अ) गाजराचे गुलाबजामुन ब) गाजर हलवा
 ३.२ उष्मांक प्राप्तीसाठी पदार्थ
 अ) रगडा पॅटीस ब) साबुदाणा वडा
 ३.३ प्रथिने प्राप्तीसाठी पदार्थ
 अ) पनीर कुरकुरे ब) मुगडाळीचा हलवा
 ३.४ लोहप्राप्तीसाठी पदार्थ
 अ) खजूर पुडींग ब) अंजीर-खजूर बर्फी
 ३.५ कॅल्शियम प्राप्तीसाठी पदार्थ
 अ) नाचणीचे चॉकलेट ब) नाचणीची मिस्सीरोटी व चटणी
 ३.६ थायमिन प्राप्तीसाठी पदार्थ
 अ) अंकुरित कडधान्याची धिरडी ब) नवरत्न पुलाव
 प्रात्यक्षिक ४. अन्नपदार्थाचे पोषणमूल्य व किंमत ठरविणे

६१

८४

प्रश्नसंच

१३४

संदर्भ ग्रंथ सूची

१३९

Sarda Education Society (Trust)'s
(A Linguistic Minority Educational Institute)
SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE
ANJANGAON SURJI- 444705, DIST- AMRAVATI (Maharashtra)

(Affiliated to Sant Gadge Baba Amravati University, Amravati)

DR BASHISTH CHOUBEY

MA., PhD

Principal

Cell No-

Personal :- 9423853815

College :- 9423696043



STD Code : 07224

Office : 242010/242011

Fax : 242010

Website : www.rscollege.ac.in

E-mail : smtrscollge@gmail.com

No. Guest/07

Date: 17.01.2019

CERTIFICATE

This is to certify that Dr Kiran Belurkar, Associate Professor of Home-Economics, Mahatma Fule Arts, Commerce & Science College, Batkuli has delivered her scholarly speech on 'Therapeutic Diet' on 17th January 2019. We know your time is precious and we are grateful you shared some of it with us. We look forward to your participation in future events.



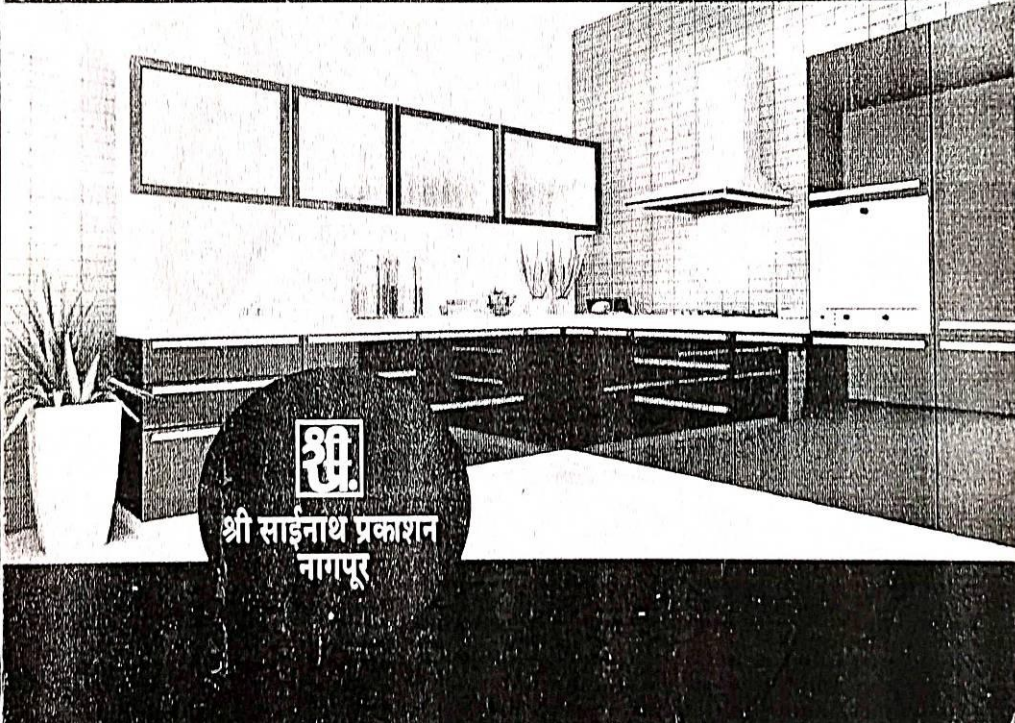
Berry
Principal

Principal
Principal
mt. Radhabai Sarda College Of
Arts, Commerce & Science
Anjangaon Surji



कौटुंबिक संसाधनाचे व्यवस्थापन आणि गृहसजावट

डॉ. संगीता आ. जवंजाल
डॉ. किरण रा. बेलूरकर



संत गाडगेबाबा अमरावती विद्यापीठ आणि राष्ट्रसंत तुकडोजी महाराज
नागपूर विद्यापीठाच्या बी.ए. भाग १, सत्र-२ च्या अभ्यासक्रमानुसार

कौटुंबिक संसाधनाचे व्यवस्थापन आणि गृहसजावट

लेखिका

डॉ. संगीता आ. जवंजाळ
एम.ए. (गृहअर्थशास्त्र); एम्.फिल., पीएच.डी.
सहयोगी प्राध्यापक, विभाग प्रमुख
श्रीमती राधाबाई सारडा कला,
वाणिज्य व विज्ञान महाविद्यालय,
अंजनगाव सुर्जी

डॉ. किरण रा. बेलूरकर
एम.ए. (गृहअर्थशास्त्र) एम्.फिल., पीएच.डी.
सहाय्यक प्राध्यापक, विभाग प्रमुख
महात्मा ज्योतीबा फुले वाणिज्य, विज्ञान व
विठ्ठलराव राजत कला महाविद्यालय,
भातकुली

श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स, धरमपेठ, नागपूर - १०

- प्रकाशन क्र. ३२२
- कौटुंबिक संसाधनाचे व्यवस्थापन आणि गृहसजावट
ISBN-978-93-84642-81-5
- प्रकाशक
ललिता पुराणिक
श्री साईनाथ प्रकाशन
१, भगवाघर कॉम्प्लेक्स
धरमपेठ, नागपूर - ४४० ०१०
फोन - (०७१२) २५२४४९८, ९८८१७१८२२४
- पहिली आवृत्ती : २६ जानेवारी २०१८
- लेखिका
डॉ. संगीता आ. जवंजाळ
डॉ. किरण रा. बेलूकर
- अक्षर जुळवणी
संपदा क्रिएशन्स, नागपूर
- मुद्रक
सुविचार प्रकाशन मंडळ, नागपूर
- मुखपृष्ठ
डॉ. भाऊ दांदडे, नागपूर
- किंमत - ₹ १५०/-

३) फर्निचरची मांडणी

५०-६३

(Furniture Arrangement)

- ३.१ फर्निचरची शैली किंवा पद्धती
 - अ) पारंपारिक शैलीचे फर्निचर
 - ब) समकालीन शैलीचे फर्निचर
 - क) आधुनिक शैलीचे फर्निचर
- ३.२ फर्निचरचे प्रकार
- ३.३ फर्निचरच्या निवडीवर परिणाम करणारे घटक
- ३.४ विविध खोल्यांमधील फर्निचरची मांडणी
- ३.५ विविध प्रकारच्या फर्निचरची काळजी

४) जलसंधारण, सांडपाणी निष्कासन आणि कचरा विल्हेवाट ६४-७८

- ४.१ जलसंधारणाची गरज, महत्त्व आणि पद्धती
(Need, importance and method of Water Conservation)
- ४.२ सांडपाण्याच्या निष्कासनाची गरज आणि महत्त्व
(Need and importance of house drainage)
- ४.३ सांडपाणी निष्कासनाच्या पद्धती
(Methods of house drainage)
 - अ) सांडपाणी सौम्य करणे (Dilution)
 - ब) सांडपाणी शुद्ध करणे (Purification)
 - क) शोषखड्डे (Soak pits)
- ४.४ कचऱ्याचे प्रकार आणि कचरा विल्हेवाटीची गरज
(Types of waste and need of waste disposal)
- ४.५ कचरा विल्हेवाट करण्याच्या पद्धती
(Methods of waste disposal)
 - अ) खत तयार करणे (Composting)
 - ब) गांडूळ खत (Vermi Composting)
 - क) कचरा पुर्ननिर्मिती (Coservancy System)
 - ड) खड्डे भरणे (Dumping)
 - इ) भस्मीकरण (Incineration)

- ५) रोजगारसंधी, स्वयंरोजगार संधी आणि योजना ७९-११३
(Job Opportunities, Self Employment and Abilities)
- ५.१ रोजगार संधी आणि स्वयंरोजगार संधीच्या व्याख्या
(Definitions of Employment and Self Employment)
गृहअर्थशास्त्र विषयात स्वयंरोजगाराची गरज
(Need of Self Employment in Home Economics)
- ५.२ गृहअर्थशास्त्रामध्ये रोजगार आणि स्वयंरोजगाराच्या संधी
(Opportunities of Job and Self Employment in Home Economics)
- ५.३ स्वयंरोजगाराची मार्गदर्शक तत्त्वे
(Guiding Principles of Self Employment)
- ५.४ स्वयंसहायता बचतगटाची संकल्पना फायदे
(Concept and Benefits of Self Help Group)
महिला सक्षमीकरणात स्वयंसहायता बचत गटाची भूमिका
(The Role of Self Help Groups in Women Empowerment)
- ५.५ स्वयंसहायता बचत गटाच्या यशस्वीतेचे मार्ग
(Ways of Success of Self Help Groups)
स्वयंसहायता बचत गटात महिला आर्थिक विकास महामंडळाची भूमिका
(Role of MAVIM (Mahila Arthik Vikas Mandal)
in Self Help Groups)

प्रात्यक्षिके
भरतकला

११४-११८

- a) भरतकलेचे टाके
१) अळी टाका (Button knot Stich)
२) मणीकाम (Bead Work)
३) काचकाम (Glass Work)
४) हेरिंगबोन टाका (Herringbone Stich)
५) जरदोजी वर्क (Jardozi Work)
६) बंगाली काथा (Kantha Work)
- b) Embroidering two or three stitches on the Apron :

बचतगटाला भेट देण्यासंबंधीचे प्रपत्र

११९-१२०

संदर्भ ग्रंथसूची

१२१-१२२