

Five Days Training Workshop on

BEEKEEPING

11th to 15th Feb. 2019

Organized by



**Department of Zoology and Botany
Sevadal Mahila Mahavidyalaya, Nagpur**

In association with



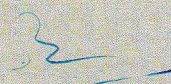
**Khadi and Village Industries Commission
(KVIC), Govt. of India, Divisional Office, Nagpur**



Workshop Report

2018-19




Principal
Sevadal Mahila Mahavidyalaya
Umrer Road, Nagpur-9.

INTRODUCTION

The specific objective of organizing the Five Days Training Workshop on 'Beekeeping' in collaboration with divisional office of Khadi and Village Industries Commission (KVIC), Govt. of India, Nagpur is to provide consolidate insights and to explore practical skills of beekeeping techniques. This workshop is organized for the Post Graduate students of Zoology and final year Under Graduate students of Zoology and Botany. Beekeeping is the very low investment and little skills oriented technique, this Industry have the potential to offers direct employment to lakhs of people, specifically farmers. Sustainability of this industry is therefore vital to the country's economic wellbeing and development.

Sevadal Mahila Mahavidyalaya was accredited by National Assessment and Accreditation Council (NAAC) with 'A' Grade successively for two terms. Organization of skill oriented workshops/courses for students, specifically for institutional Assessment and Accreditation point of view it has significance. Similarly, it is a part of institutional mission & goals to empower the girl students by helping them to become strong, self-reliant, socially motivated, responsible women and better citizen of tomorrow.

Khadi & Village Industries Commission (KVIC), which was established with the inspiration of Rashtrapita Mahatma Gandhi, took the task of development of beekeeping Industry with a view to uplift the financial status of people living in rural areas by introducing and popularizing modern beekeeping. It is agriculture based industry and it plays a vital role in the livelihoods of the rural communities in four dynamics; (i) It is an income generating activity (ii) Provides food and Medicine (iii) It supports agricultural activities through cross pollination as it increases the crop yield (iv) It contributes immensely to forest conservation. Beekeeping has great importance in the agriculture based economy with pollination services, especially oil seeds and pulses production. According to Dr. Swami Nathan, second green revolution is possible only by increasing the pollinators, such as honeybee. In most of villages in India, beekeeping is feasible. Hon'ble Prime Minister in recent days emphasized on the importance of beekeeping and said that "Now there is a need of Sweet Revolution after White Revolution"

On this occasion, I would like to extend my sincere thanks to the Hon'ble Principal, Sevadal Mahila Mahavidyalaya for his motivation and support. My thanks are also due to Hon'ble Director, KVIC divisional office, Nagpur; Guest Speakers, Raj Bhavan officials and Students for their cooperation. Total 72 students and 08 faculty members have participated in this workshop.

Dr. Anil Mohite
Head, Department of Zoology &
Convener of Workshop



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DAY - I

INAUGURAL FUNCTION

On the onset of Inaugural Function, Vidyapeeth Geet has been presented by the students of Music Department. Dr. A. S. Mohite, Head of the Department of Zoology and Convener of the workshop has welcomed the participants and presented the theme of the Five Days Training Workshop on Beekeeping.



Figs.1-3: Inaugural Function: 1. Dignitaries on dias, Chief Guest- Dr. G. N. Paliwal, Director, Centre for Bee Development, Wardha; Chairperson- Mr. Sanjayji Shende, President, Sevadal Mahila Mahavidyalaya, Nagpur; Guest of honour- Mr. S. V. Gudhe, Ex-deputy Director, KVIC Divisional office, Nagpur; Convener- Dr. A. S. Mohite, Associate Professor and Head, Department of Zoology; Organising Secretary- Dr. V. S. Dongre, Associate professor, Department of Botany. 2. Welcome of Chief Guest by offering floral bouquet. 3. Workshop participants i.e. U.G. and P.G. students.

Dr. Gopal N. Paliwal, Director, Centre for Bee Development (CBeeD) was the Chief Guest for inaugural function and keynote speaker. He began his keynote address on "Sustainable Development of Honeybee. He has introduced the participants with various species of honeybees and sustainable management of *Apis dorsata*. His centre has designed the Ahimsa Forest Honey Collection (AFHC) technique to harness geo-specific

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wild varieties of bees for sustainable honey production, and for post-harvest management of storage, processing, packaging and marketing.

He further said that the innovative AFHC method has benefits for all stakeholders touched by scientific apiculture: **1.** Better for the forests – Preserves the bee-fauna, which is crucial for cross pollination and regeneration of the forest eco system, **2.** Better for the bees – Honey is extracted non-violently, without destroying bees or their honeycombs Better for honey collectors – Specially designed gear to protect from bee stings and tree climbing accidents, **3.** Better for tribal – Over 18000 tribal people have been trained in the new AFHC method, and are reaping the revenue benefits of the more efficient processes and techniques. Further, there is assured buyback of harvested honey-wax, to ensure fair earnings. Each trained honey collector on average earns Rs. 9100 annually for the family, more than tripling the earlier per capita income, and **4.** Better for consumers – Higher content of healthy pollen, more diabetic friendly sucrose levels, longer shelf life.

His Centre for bee development has focused on skills training of traditional honey hunters, farmers, shepherds and forest dwellers. Relevant gear will be provided. **Dr. Gopal N. Paliwal** is credited with developing a unique technology 'Sewagram Nisarg Technique of Rockbee Management' for safer and multi fold harvesting of honey and wax from the wild nests of rockbee species.

Shri Sanjay Shende, President, Sevadal Education Society, Nagpur in his presidential address said that the college has always been on the forefront by arranging such workshops. He also congratulated the organizers. He has shown keen interest in the beekeeping workshop.

In the second session, **Mr. S. V. Gudhe, Ex-Deputy Director, KVIC** has given nice presentation on "Wonderful world of honey bees". He has given all details about types of bees, life cycle of honey bee and work activity of honey bee.



Figs.1-3: Inaugural Function & Keynote Address: 1. Convenor Dr. A. S. Mohite presenting the theme of workshop. 2&3. Keynote Address by Chief Guest Dr. G. N. Paliwal.

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Types of honey bees:

1. *Apis mellifera*: It is European bee, generally found in Europe and Italy. The Italian variety is superior and can be domesticated easily. It can produce 25 to 40 kg of honey per year per colony.
2. *Apis Florea*: It is called the little bee. They construct the small comb on branches of trees, bushes or under wall of buildings. It can be domesticated but does not produce good amount of honey.
3. *Apis dorsata*: It is called the Rock bee. It construct very large comb on the tall trees, buildings and caves. Honey and wax of this bees are the major forest product. They could not be domesticated yet. A large comb may yield 20 to 30 kg of honey at a time. Two crops mature in a year one in May/June and another in October/November. These bees are very furious.
4. *Apis cerana indica*: It is called the Indian bee. It is less furious. It can be domesticated easily. Though the production per comb is less still it is good for its gentle nature. This bee is widely used in bee keeping cottage industry in India. It produces good quality 3 to 6 kg honey per colony per year.

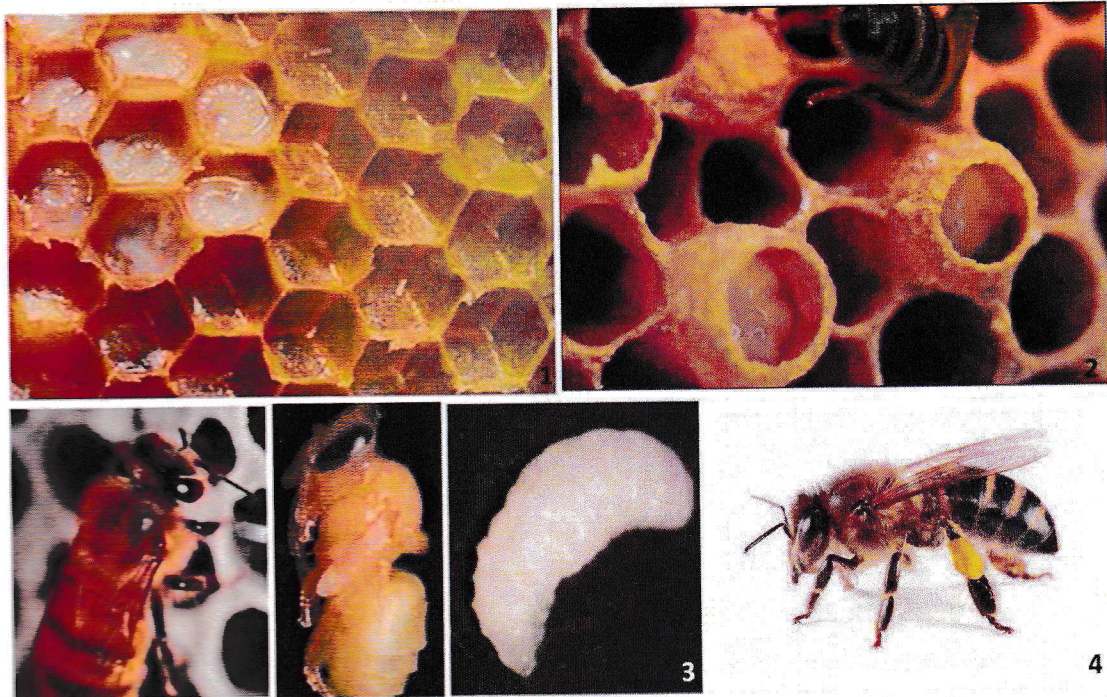
Life cycle of honey bees: The honeybees are trimorphic consisting of a **queen, drones and workers** within a colony.

Queen: The queen is 1.5 times larger than the worker bee, with shorter wings and elongated and pointed abdomen. Pollen collecting and wax secreting structures are absent. It is only fertile female in the colony. Queen mates with male (Drone) during nuptial flight. Sperms are stored in the spermatheca. Queen lays 1500 to 2000 eggs per day. During her life time, she lays about 15,00,000 eggs. Queen may lay fertilized or unfertilized eggs. Workers are produced from the fertilized eggs and drones are produced from unfertilized eggs. The egg which produces a queen is a normal fertilized egg, but the hatched larva is fed on a special food called Royal Jelly. Life span of queen is 6 to 8 months.

The eggs hatches into larva. There are five larval instars. Larval development is completed in 7-8 days. When larval development is completed the mouth of the cell is closed up with wax-cap by the other worker bees. The larva then converted into pupa. Pupal period of the queen is 15 days while pupal period of workers pupae is 20-21 days. The adult bites away the cap of the cell and comes out.

Worker bees: They attend the queen, the construction of brood is done by young worker bees while field work i.e. the collection of nectar and pollen is carried out by later age worker bees. Other duties of the workers include guarding the combs, air conditioning (temperature regulation of comb) and ripening of nectar to produce honey. Life span of worker bee is 90 days.


Principal



Figs.1-3: Life stages of honey bee: 1-2. Eggs and larval stages in the cells. 3. Developmental stages such as larva, pupa and adult. 3. Adult worker bee.

Period	Work activity
Days 1-3	Feeding to older larvae (nursing)
Days 6-10	Feeding to younger larvae (nursing)
Days 8-16	Wax secretion and construction of hive
Days 14-30	Receive the nectar and pollen from field bees
Days 30 onwards	Nectar and pollen foraging, Entrance guards

Drone bee: They are unable to feed himself and is dependent on the workers for food. The only function of male (drones) is to fertilize virgin female. Only one male is copulated with the female. The surplus drones are driven out of the hive by the workers.

Swarming: When the colony increases in population, they have a natural instinct of sending out a part of the colony as swarm to establish a new colony elsewhere. One key trigger of the swarming instinct is when the queen has no more room to lay eggs and the hive population is becoming very congested. Under these conditions, a prime swarm may issue with the queen, resulting in a leaving the old colony with a large number of hatching

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bees. The queen who leaves builds herself in a new hive with no eggs and no larvae but lots of energetic young bees who create a new set of brood combs from scratch in a very short time.



Figs.1-3: Keynote Address: Dr. G. N. Paliwal showing various instruments and equipments used in sustainable beekeeping technique. 2. Lecture by Mr. S. V. Gudhe on beekeeping. 3. Inaugural speech by chairperson Mr. Sanjayji Shende.

Before leaving, the worker bees fill their stomachs with honey in preparation for the creation of new honeycombs in a new home. This cargo of honey also makes swarming bees less inclined to sting.

DAY – II

On the second day of workshop, offstage activity have been organized at Rajbhavan and Entomology section of Dr. Panjabrao Deshmukh Krushi Mahavidyalaya at Maharajbag to acquired practical knowledge and handling of *Apis mellifera* and *Apis cerana indica*. Students acquaint themselves regarding the movable frame hive at both places. KVIC trainer Mr. S. V. Gudhe and Mr. V. K. Thakre has given complete information about movable frame hive.



Figs.1-3: Practical demonstration of beekeeping *Apis mellifera* at Rajbhavan.

For the culture of honey bees, special type of frame hives are used called Langstroth's movable frame hive. Langstroth (1851) designed first movable frame hive for artificial colonization of *Apis mellifera* and production of honey and wax on large scale.

Generally hive boxes are two in number (i) The lower one is the brood chamber and (ii) the upper one is the honey chamber (super). Langstroth's hive was originally designed as a single brood chamber hive. It is not enough for a commercial apiary, particularly in the flowering season and therefore, two brood boxes and two honey supers are kept together. A standard Lanstroth's hive accommodates 7-11 frames. Distance between two frames is 47mm.

Frame hive composed of-

1. **A Stand:** The entire hive rests on the stand having four legs of 6-9 inches high, with dimensions to support the floor board.
2. **A floor or bottom board:** The floor board is a tray with all its four sides raised by side runners. The floor board is of 55 x 40cm size. The front side has projecting piece called the adjusting board. In the middle of the front runner has a small space as entrance gate for the bees.



Figs.1-2: Colony of honeybees 1. Queen and worker bees. 2. Cell for future queen bee.

1. **The brood chamber:** The brood chamber is a rectangular wooden box like structure without top and bottom. It's size is 45 x 40cm. It rests on bottom board. Internally, it has movable wooden frames in a parallel fashion. The wooden frames having a top bar, 2 side bars and a bottom bar. Both ends of the top bars are extended to rest on the rabbet. Top bar is grooved for holding the comb foundation. A sheet of bees wax is fixed in the space of the frame as a comb foundation. The bees construct new cells on this foundation in future.



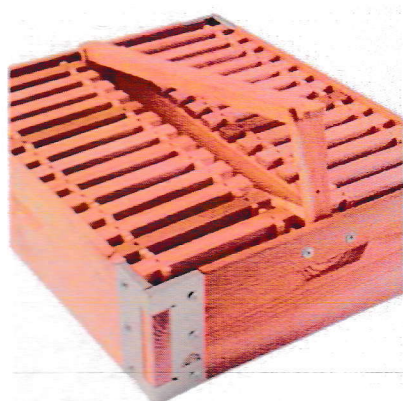
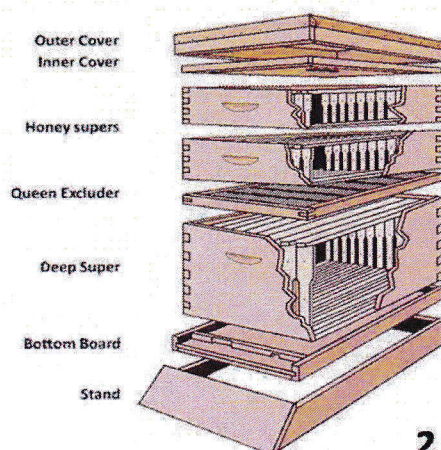
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Figs. 1-3: Practical demonstration of beekeeping *Apis cerana indica* at PDKV agriculture college, Nagpur.



Fig. Participants of Five Days Training workshop on Beekeeping.



Figs. 1-3: Langstroth's (artificial) beehive, wooden frames, comb foundation, etc.

2. **Queen excluder:** There is a zinc or fibre wire frame (50 x 40cm) with 2.3-3.5mm perforations, placed in between brood and super chambers which selectively allows workers to move from one chamber to another but prevents the queen to do so as her thorax is 4.3mm thickness. So, It is called 'queen excluder'
3. **The honey chamber or super:** Size is same as that of brood chamber and internal arrangement is also same. It is store house of honey and wax.
4. **Top cover:** The top of the hive is closed by the inner flat and outer roof like cover and provided with a ventilator and an exit for the bees.

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DAY – III

On the third day a guest lecture of **Dr. B. S. Rahile, Associate Professor, Department of Zoology, Shivaji Science College, Paoni** on “**Bee Conservation for Food Security**” was organized. He has thoroughly explained the importance of conservation of honey bee and the economics behind it. He has emphasized on the honey bee pollination services for maximum crop yield.



Fig. Guest lecture by Dr. B. S. Rahile, Associate Prof, Shivaji Science College, Pawani on Bee Conservation for Food Security.

He said that, over the past decades, both wild and domesticated insect pollinators are in dramatic decline, which puts at stake the existence of species, ecosystem resilience and global food security. Globally, 87 of major food crops depend on animal pollination. Together these account for 35 % of the world food production volume. To restore and protect honey bee populations, we have to tackle four key issues: parasites and pathogens, poor nutrition, the use of pesticides, agricultural practices, and the economic empowerment of bee keepers. Our planet's food security is largely dependent on an abundance of natural pollinators; including honey bees, birds, and other insects. Honey bee colonies throughout the world and in India also have been declining at an alarming rate. Training to farmers and growers on pesticide stewardship; and training to female will promote growth in honey bee populations and provide a mechanism for sustaining healthy honey bee colonies. This commitment is an important step in restoring vital honey bee populations and ensuring sustainable crop yields; a critical need for global food security.

He further said that, awareness should be created on the value of honeybees for crop pollination, improving the crop yield and quality to ensure food security. Farmers should also be aware of saving honeybee colonies from misuses of agrochemicals applied on cereals, pulses, legumes and horticultural crops during flowering. Designing local or scientific prevention and control methods for emerging honeybee pests, predators and climate change adaptive feed sources is timely. Selecting, propagating and planting of

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honeybee flora preferably multipurpose species preferably resilient to changing climate are very important

DAY – IV

On the fourth day a guest lecture of **Ms. Prajakta Admane** has been organized. She has given a wonderful presentation on honey bee products, specifically different flavoured varieties of honey.

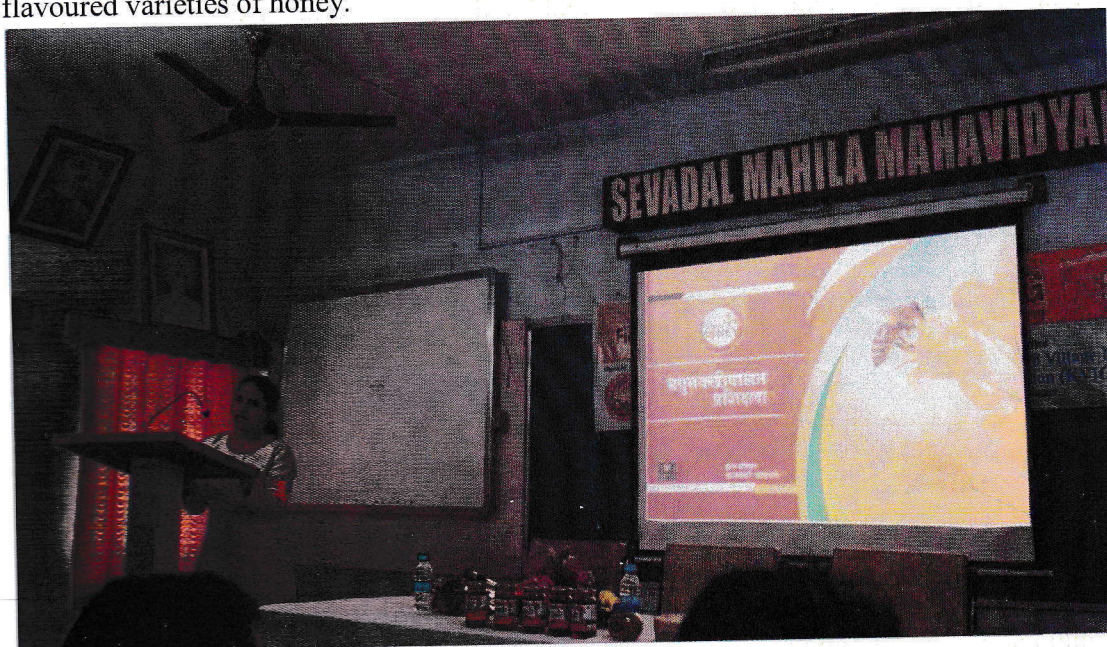


Fig. Guest lecture of Ms. Prajakta Admane, Beekeeper (Entrepreneur) on Basics of Beekeeping.

Prajakta rears honey from fifty boxes of bees. Taking inspiration from the floral variety in the Gadchiroli forests, she has also started manufacturing flavoured honey, and some flavours include berry, eucalyptus, litchi, sunflower, tulsi and sesame. All the varieties of honeys have various benefits which are quite good for the human body. The berry honey, for example, is excellent to fight diabetes while the sesame honey helps control heart diseases. While the eucalyptus honey is a good at curing common illnesses like a cough and cold, ajwain helps digestion.

Prajakta sells these varieties of honey under her own brand, called **Kasturi honey**. Apart from bee rearing and honey production, Prajakta also sells bee venom. This venom is used in the medical industry to fight arthritis, nerve pain and multiple sclerosis.

The business has helped Prajakta earn about Rs 6-7 lakh annually. She has also been teaching the basics of beekeeping to unemployed youth and women of her village, helping them earn well.



Fig. Honey extractor

Honey extractor: This is a mechanical device used for extraction of honey from honey chamber frames. It is hand operated or electric operated, act on the principal of centripetal force.

Bee Products:

Economic Importance of Honey: *As a food:* Honey is always taken in natural form as food. Honey is highly nutritious. Besides sugar it contains minerals and vitamin B-complex, Vitamin C, E and K.

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As a Medicine: Honey is a medicine in Ayurveda. It remove weakness, mental fatigue, diabetics, tuberculosis and nervous disorders. Honey is good ointment with antibiotic property. It can be used for healing wounds and ulcers. It acts as a natural bactericide and clear mucous membrane of nose, throat and alveoli of lungs and therefore best remedy for sinusitis and pulmonary tuberculosis. Honey is best cardiac medicine, it improves the functioning of heart. It supplies glucose to heart muscles.

Economic importance of bees wax: It has great demand in the world market and is used in the cosmetic and pharmaceutical industries. Beeswax is used as thick base of creams, lip-guards, face packs and lotions. It is readily absorbed by the skin which gives a skin a smooth soft appearance and whitening. It is available in the form of anti-wrinkle cream. Anti-wrinkle cream prepared from Royal Jelly and bees wax is the costliest cosmetic in the world.

Pollen: Pollen is good source of protein. It can be easily collected by placing a pollen trap at hive entrance. Pollen is suitable for medical and prophylactic purposes. It is effective for treating hyper tension when mixed with honey (1:1). It can be used for complaints of nervous and endocrine systems. It is also used in various cosmetic preparations.

Royal jelly: This is secreted by the bees from special glands in their body. It is produced by nurse bees to feed the queen bee throughout her larval and adult life. It is harvested from queen cells. It contains various natural hormones and is a highly concentrated food. It has a great demand for exports.

Bee venom: It has been used to cure arthritis, spondylosis deforming, rheumatism, certain eye diseases like iritis and skin diseases (tuberculosis of skin), inflammation of facial and other nerves, hypertension etc. It is also known to lower down the cholesterol level.

Propolis: It is the resinous substance collected by bees from trees to seal cracks in the hive. It has anti-microbial properties and is effective in healing wounds as a medicine for removing corns and good value in dental medicine

DAY - V

VALEDICTORY FUNCTION

On the last day, **Mr. S. V. Gudhe** has shown the video clips on beekeeping practices by farmers. In his lecture, he has explained the products and its importance. Lecture followed by valedictory function.

Prof. Pravin Charde, Principal, Sevadal Mahila Mahavidyalaya was the chief guest for valedictory function. On this occasion, he spoke on the importance of honey bees and their hard working nature. He has revealed many facts of honey bee behavior. He guided the student on various aspects of day-to-day life.


Principal

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Figs.1-4: Valedictory Function: 1. Dr. Dorlikar, Assistant Professor, Department of Zoology summarizing the events undertaken during the workshop. 2&3. Welcome of Principal, Prof. Pravin Charde, Sevadal Mahila Mahavidyalaya and Mr. S. V. Gudhe, Ex-deputy Director, KVIC Divisional office, Nagpur by offering floral bouquet. 4. M.Sc. Semester IV student giving her feedback on workshop.



Figs.1-4: Valedictory Function: Principal, Prof. Pravin Charde, Sevadal Mahila Mahavidyalaya speaking on the occasion. 2. Distribution of certificates to participants. 3. Certificate 4. Dr. (Mrs.) J. B. Tirpude presenting the vote of thanks

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Five Days Training Workshop on 'Beekeeping'

List of Participant

S.No.	Name of Students	S.No.	Name of Students
	M.Sc. II	41	Miss. Nikita D. Wasnik
1	Miss. Alfiya Chisty	42	Miss. Pooja B. Meshram
2	Miss. Arzoonaz Sheikh	43	Miss. Prachi D. Shrivastav
3	Miss. Ashwini Meshram	44	Miss. Priya N. Bisen
4	Miss. Bhagyashree Thakare	45	Miss. Roshni N. Dhobale
5	Miss. Darshana S. Kamdi	46	Miss. Sakshi Tabhane
6	Miss. Harsha Bhati	47	Miss. Sangeeta M. Verma
7	Miss. Kajal Kamble	48	Miss. Shital D. Shiwarkar
8	Miss. Karishma Kambli	49	Miss. Shital G. Kumbhalkar
9	Miss. Krutika Dhabale	50	Miss. Shubhamngi T. Zade
10	Miss. Leena Choudhari	51	Miss. Sweety W. Bhongade
11	Miss. Lokeshwari Rhangadale	52	Miss. Tuba Yasmin Saleem Ahmad Khan
12	Miss. Mayuri R. Khandode	53	Miss. Vaishnavi L. Malewar
13	Miss. Monika Wairagade	54	Miss. Varsha A. Chakole
14	Miss. Nauseen Ansari		B.Sc. III
15	Miss. Neha K. Thakur	55	Miss. Anjali Tulashidas Arekar
16	Miss. Nilima Zodpe	56	Miss. Dhanshree Prakash Kakde
17	Miss. Priyanka Lute	57	Miss. Diksha Prakash Bisan
18	Miss. Santoshi Burile	58	Miss. Firdous Tabassum Mohd. Daud
19	Miss. Sayali Chincholkar	59	Miss. Kajal Shrawan Kawale
20	Miss. Shamali Nagpure	60	Miss. Kishori Gangadhar Jibhakate
21	Miss. Shital Bhure	61	Miss. Mahevish Maryam Saleem Khan
22	Miss. Shraddha Choudhari	62	Miss. Nainshree Vindosingh Thakur
23	Miss. Swati Meshram	63	Miss. Nikita Pramod Yerguntwar
24	Miss. Tejshwini Meshram	64	Miss. Pathan Ruksar Latif Kha
25	Miss. Vaishnavi Gajjalwar	65	Miss. Samidha Ramesh Chafekar
26	Miss. Vishakha Ninawe	66	Miss. Sayali Sunil Mahurkar
27	Miss. Prajakta A. Hadge	67	Miss. Sharda Hiralalji Ashtankar
28	Miss. Sapana S. Marbate	68	Miss. Shifa Anjum Shaikh Akram
	M.Sc. I	69	Miss. Shrutika Ramdas Thakre
29	Miss. Aishwarya S. Gajbhiye	70	Miss. Tabassum Parveen Yusuf Mohammad
30	Miss. Annapurna B. Mishra	71	Miss. Vruttika Purushottam Kawale
31	Miss. Chaitali N. Mondhe		Name of Staff Members
32	Miss. Dhaneshri R. Gajapure	72	Dr. A.S. Mohite
33	Miss. Garima D. Katre	73	Dr. (Mrs) J. S. Dahegaokar
34	Miss. Heena R. Devgirkar	74	Dr. (Mrs.) J.B. Tirpude
35	Miss. Jyoti C. Parihar	75	Dr. Manoj Bangadkar
36	Miss. Kalyani R. Pimplapure	76	Dr.(Mrs.) Mangala Thakre
37	Miss. Karishma M. Raut	77	Dr. A. V. Dorlikar
38	Miss. Khushbu S. Bangalkar	78	Dr. Mrs. Sulbha Kulkarni
39	Miss. Mayuri S. Tajne	79	Dr. V. S. Dongre
40	Miss. Minakshee B. Sawarkar	80	Dr.(Mrs.) Indralata P. Bhagat


Principal

