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ANNUAL REPORT

2014-15

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All India Coordinated Research Project on Mushroom

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ICAR-Directorate of Mushroom Research

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(Indian Council of Agricultural Research)

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Chambaghat, Solan - 173 213 (H.P.), India

ANNUAL REPORT 2014-15

All India Coordinated Research Project on Mushroom

ICAR-Directorate of Mushroom Research

Solan - 173 213, India

Compiled and Edited by : **Dr. Satish Kumar,** Principal Scientist
Dr. Shwet Kamal, Senior Scientist

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Project Coordinator, AICRPM
ICAR-Directorate of Mushroom Research
(Indian Council of Agricultural Research)
Chambaghat, Solan-173213 (H.P.)
Tel: +91 1792 230451 (O), 230401 (R)
Fax: +91 1792 231207
Email: director.mushroom@icar.gov.in
Web: www.nrcmushroom.org

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Phone: 011 28115949, 28116018
Mobile: 09811349619, 09953134595
Email: yugpress01@gmail.com, yugpress@rediffmail.com

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PREFACE

Mushroom cultivation is an activity that uses agro-industrial wastes and aerial space. With the availability of improved production technologies of different mushrooms, a large number of seasonal growers and Hi-tech farms are coming up in different part of the country. Barring seasonal cultivation, share of button mushroom is likely to decrease in coming years and share of specialty mushrooms are likely to increase. It is their unique flavor, texture and medicinal properties for which mankind has long devoured mushrooms but scientific exploitation of nutritional and medicinal properties is a recent phenomenon.

India is blessed with a varied agro-climate, abundance of agro-industrial waste cheap man power making it suitable for cultivation of all types of temperate, tropical and sub-tropical mushrooms. In the scenario, where more than 650 million people are dependent on agriculture and more than 300 million people are malnourished while millions of people are below poverty line, there is a need for improving quality of life through food and nutritional security, employment opportunity, poverty alleviation and gender equality. In this context also, mushroom cultivation has been recognized as a gainful approach. With increase in per capita income and accelerated growth of health conscious population, demand for mushroom is on increase which is expected to further accelerate.

To promote mushroom cultivation and multilocation testing the varieties and technologies, All India Coordinated Research Project on Mushroom (AICRPM) came into existence during VI Five-Year Plan on 01.04.1983 with its Headquarters at Directorate of Mushroom Research, Solan (HP). The Director, DMR, Solan (HP) also functions as the Project Coordinator of the project. Initially the AICRP on Mushroom started with six centres viz., PAU, Ludhiana; GBPUA&T; Pantnagar; CSAUA&T, Kanpur; BCKVV, Kalyani; TNAU, Coimbatore and MPAU, Pune. During VII Plan, two existing centres at Kanpur (UP) and Kalyani (West Bengal) were dropped and IGKVV, Raipur was added as new centre. Three new centres during VIII Five Year Plan while 3 coordinating and one cooperating centres during IX Five Year Plan were added by dropping one at Goa. Four coordinating and one cooperating centres were added during XI Plan. These were: OUAT, Bhubaneshwar; HAU, Hisar; RAU, Samastipur; CAU, Pasighat (coordinating centres); and HAIC, Murthal (Cooperating centre). During the XII five year plan 11 more coordinating and 9 cooperating centre were added and Faizabad centre was dropped. Presently, 23 coordinating and 9 cooperating centres are part of AICRPM programme. All the coordinating centres work for a common mandate of germplasm collection of native edible flora, multilocation testing of the varieties and technologies, trainings and supply of spawn to the growers. The technical programme for conducting participatory research during 2014-15 was finalized in the annual workshop organized at RAU, Pusa on 20-21 March, 2014. During the year under report, attempts were made to collect edible mushrooms in different parts of the country, evaluate promising varieties/ strains of white button mushroom, paddy straw mushroom, milky mushroom, oyster mushroom, etc. and standardize cultivation technology of specialty mushrooms, which are needed to diversify the mushroom cultivation scenario in the country. Survey and collection of mushrooms is an important activity of AICRP Mushroom and during the period under report a large number of germplasm was collected by different centres. Most of the centres have deposited pure culture of wild germplasm in the Gene Bank of ICAR-DMR, Solan.

The results of various experiments exhibited a vast scope of commercialization of mushroom farming as secondary agriculture. Depending upon the climatic conditions and availability of raw materials, the mushroom varieties and raw materials can be identified to promote mushroom cultivation in a particular region.

(Project Coordinator)

SUMMARY

All India Coordinated Research Project on Mushroom fuctions in a coordinated manner in association with fourteen coordinating and two cooperating centres located in different agro climatic zones of India to test and validate the technologies or to identify varieties, developed at Directorate of Mushroom Research, Solan and other centres in various regions of India to promote climate-wise mushroom cultivation in India so as to reduce the cost of cultivation. During the year under report (2014-15), the research trials were conducted at all the sixteen centres based on technical programme finalized during the annual group meeting of AICRPM workers held on 20-21 March 2014 at RAU, Pusa, Samastipur.

During the year 2014-15, five experiments were conducted on strainal evaluation of four different mushrooms i.e. white button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus* spp.), paddy straw mushroom (*Volvariella volvacea*) and milky mushroom (*Calocybe indica*) at various centres. Strain evaluation trials of white button mushroom were on advance varietal trial -1 for selected white accessions of *A. bisporus*. In the experiment of AVT, the maximum yield of 21.28 kg per 100 kg of compost was recorded in the strain AVT-14-06 at Pune Centre followed by Nauni centre. The strain AVT-14-01 performed very well at Nauni centre and headquarters with a yield of 20.50 and 17.90 kg per 100 kg compost. Overall best average productivity was recorded in AVT-14-06 with 20.37 kg followed by AVT-04-07 with 17.95 kg per 100 kg compost. The time taken in first harvest (days post casing) was in the range of 8.09 to 23 days. The lowest first harvest time (8.09 days) was recorded in AVT-14-04 at Murthal centre. Overall the lowest first harvest time was recorded in control (U-3) and AVT-14-04. Average fruit body weight also varied at different centres and was recorded maximum (33 g) at Murthal centre in the strain AVT-14-02 and AVT-14-04 (31 g). The average fruit body weight ranged between 13.52 - 17.69 g in almost all the strains. The overall maximum fruit body weight was recorded in AVT-14-02 and AVT-14-05.

A total of six strains of *V. volvacea* were tested at four different locations. The trial was assigned to five centres and a total of six strains of *Volvariella volvacea* were tested. The biological efficiency of various strains varied in the range of 4.24 to 21.87 kg /100 kg of dry substrate at various centres in different strains. The maximum biological efficiency of 21.87 kg/100 kg of dry substrate was recorded in strain Vv-14-02 at headquarter followed by 21.14 kg in the strain Vv-14-05. Maximum biological efficiency for all the test strains was achieved at the Coimbatore centre. No fruiting was recorded at Bhubneshwar centre in strain Vv-14-05 and Vv-14-06. Average yield of different strains varied from 9.9 – 19.47 kg /100 kg of dry substrate at different centres.

The minimum time taken for the first harvest was 8.9 days in strain Vv-14-01 at Ludhiana centre and 11.40 days in strain Vv-14-02 at the Bhubneshwar centre. The average fruit body weight varied at different centres with a maximum of 21.20 g at Coimbatore centre in the strain Vv-14-02 while the minimum fruit body weight was recorded to be 8.9 g at Ludhiana centre in the strain Vv-14-01. All the strains have recorded the maximum fruit body weight at Coimbatore centre followed by Solan centre.

The trial on evaluation of high yielding varieties/ strains of oyster mushroom was conducted at 10 different centres. A total of six high yielding strains of *Pleurotus* species were under evaluation trial. The maximum yield of 131.27 kg /100 kg of dry substrate was obtained in strain Pl 14-03 at Coimbatore centre followed by strain Pl-14-02 (124.55) at the same centre. All the strains performed very well at different centre with high biological efficiency. At Raipur centres the best performer strain was Pl 14-05 with a yield of 84.58 kg per 100 kg dry substrate. Rest all the strains performed at par with very good biological efficiency. Strain P-14-03 performed well at Vellayani and Udaipur centres. Strains Pl-14-01 and 02 performed best at Bhubneshwar centre wheras strain Pl-14-06 out yielded all other strains at Pune center. All Cumulative averages of the yield showed that all the strains have performed well at all the centres.

The minimum time of of 14 days for first harvest of the crop was recorded in strain Pl 14 02 at Vellayani centre. The maximum time taken was 54 days in strain Pl-14-06 at Barapani. Average fruit body weight of all the strains at different centre ranged between 5.34 to 33.09 g. The maximum fruit body weight of 33.09 g was recorded in Pl-14-06 strain at Barapani centre while the minimum of 5.34 g was recorded in Pl-14-04 strain at Udaipur centre.

Advanced varietal trial for high yielding strains of milky mushroom was conducted at five centres. A total of six high yielding strains of *Calocybe indica* were under evaluation trial. Maximum yields were obtained at Coimbatore centre with a yield of 117.34 kg per 100 kg dry substrate in strain Cl 14 04. At Udaipur centre, the maximum yield of 86.80 kg per 100 kg dry substrate was obtained in strain Cl-14-04. The strain Cl-14-03 gave highest yield of 57.86 kg at headquarters. The minimum yield was obtained in strain CI-14-03 and CI-14-04 at Murthal and Solan centre, respectively. Average yield of all the strains at different centres ranged from 47.22 to 65.06 kg.

Different bacterial isolates were tested at different centres against *Mycogone perniciosa*. Inoculation of bacterial isolate B-9 @ 16^{6} -10^{7} cfu/ml/bag proved effective in controlling *M. perniciosa*.

The experiment on total indoor composting using thermophilic fungi was assigned to five different centres where tunnel facility was available. The trial was assigned to five different centres i.e. Nauni, Murthal, Ludhiana, Pantnagar and Solan. At Nauni centre, maximum yield of 19.57 kg was recorded as compared to 16.89 kg in traditional short method.

Experiment on evaluation of zero energy polytunnel (ZEPT) technology was assigned to four centres viz. Hisar, Murthal, Pusa and Solan. At Pusa centre, maximum yield of 25 kg per 100 kg compost was recorded.

Different centres have reported the collection of 193 specimens of wild mushrooms during the year and about 76 collections have been deposited at the DMR Gene Bank with passport data. During the last workshop of AICRPM, it has been decided that different mushrooms collected and consumed locally by the people of different regions will be collected and we should take advantage of the ITK available on mushrooms and utilize this germplasm instead of going for random collection of wild germplasm. In this regard it was decided that the centres will survey the local markets for collecting the germplasm in addition to forest forays, collect the data, make cultures and deposit these with DMR along with their photographs, dried samples and passport data.

All the centres carried out the extension activities by participating in State/National level Exhibition, Melas, Kisan Goshthies, mass communication through AIR/TV programmes, replying to letters, telephones, email and on the spot guidance during farm visits. Almost all the centres have conducted trainings for different durations for farmers, farmwomens, unemployed youths and entrepreneurs of their areas. The centres have also supplied the spawn and pure culture to promote the mushroom cultivation practice in their respective areas.

1. INTRODUCTION

To test and disseminate the technology developed at Directorate of Mushroom Research and its Centres in different agro-climatic regions of the country and popularize mushrooms as secondary agriculture along with the existing farming system, the All India Coordinated Research Project on Mushroom (AICRPM) was launched during VI Five-Year Plan on 01.04.1983 with its Headquarters at Directorate of Mushroom Research, Solan (HP). The Director of DMR, Solan (HP) also functions as the Project Co-ordinator of the project. During the XII five year plan 11 more coordinating and 9 cooperating centre were added and Faizabad centre was dropped.

Initially, the All India Coordinated Mushroom Improvement Project started with six Centres. At present, 23 Coordinating and nine co-operating Centres are working under AICRPM. These are:

ICAR Institute based coordinating centres

- ICAR Research Complex for NEH Region
    - o ICAR Research Complex for NEH region, Barapani (Meghalaya)
    - o ICAR Research Complex for NEH region, Sikkim
    - o ICAR Research Complex for NEH region, Arunachal Pradesh
    - o ICAR Research Complex for NEH region, Nagaland
    - o ICAR Research Complex for NEH region, Manipur
    - o ICAR Research Complex for NEH region, Mizorum
    - o ICAR Research Complex for NEH region, Tripura
- ICAR-Research Complex for Eastern Region Research Centre, Ranchi (Jharkhand)
- ICAR-Central Island Agri. Res. Institute, Port Blair (Andaman & Nicobar Island)
- ICAR-Indian Institute of Horticultural Research, Bangalore

State Agricultural Univesrsity based coordinating centres

- Punjab Agricultural University, Ludhiana (Punjab)
- Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)
- G.B. Pant University of Agriculture and Technology, Pantnagar (Uttarakhand)
- CoA, Mahatma Phule Agricultural University, Pune (Maharashtra)
- N.D.University of Agriculture and Technology, Faizabad (UP) (till 31-03-15)
- Indira Gandhi Krishi Vishwa Vidyalaya, Raipur (Chattisgarh)

- Maharana Pratap University of Agriculture and Technology, Udaipur (Rajasthan)
- CoA, Kerala Agricultural University, Vellayani (Kerala)
- C.C.S. Haryana Agricultural University, Hisar (Haryana)
- Orissa University of Agricultute and Technology, Bhubaneswar (Orissa)
- Rajendra Agricultural University, Samastipur, Pusa (Bihar)
- College of Horticulture and Forestry, Central Agricultural University, Pasighat (Arunchal Pradesh)
- CSK HPKV, Palampur (HP)

State Govt based Coordinating Centre

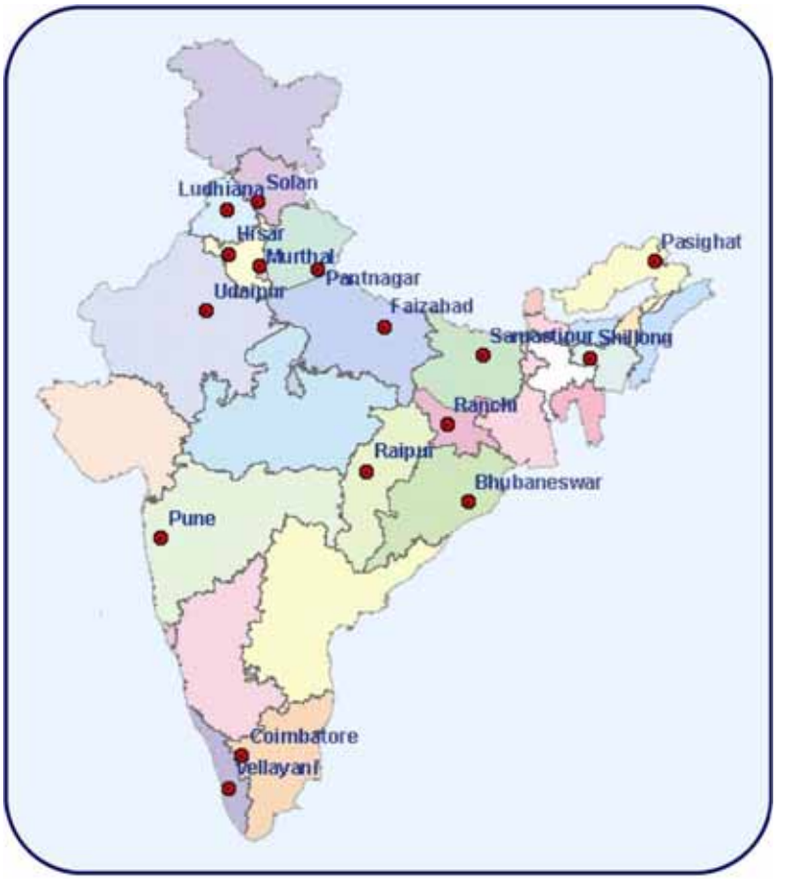
- HAIC Murthal (Haryana)

Co-operating Centres

- Dr.Y.S.Parmar University of Horticulture & Forestry, Nauni, Solan (HP).
- ICAR-VPKAS, Almora (Uttrakhand)
- Sher-e- Kasmir Uni.of Agri. Sci.&Technology Srinagar (J&K)
- Sher-e- Kasmir Uni.of Agri. Sci.&Technology Jammu (J&K)
- Assam Agri. University, Jorhat (Assam)
- Sardar Vallabh Bhai Patel Uni. Of Agri& Tech., Meerut (UP)
- Bidhan Chandra Krishi Viswavidyalaya, Nadia (WB)
- Sardarkrushinagar- Dantiwada Agri. Uni., Dantiwada (Gujrat)
- Acharya NG Ranga Agri. Uni. Rajendranagar, Hyderabad (Andhra Pradesh)

The last Group meeting of workers of AICRPM was held on 20-21 March, 2014 at RAU, Pusa, Samastipur. During the meeting the progress of last year was monitored and technical programme for 2014-15was finalized.

2. MANDATE AND OBJECTIVES



Geographical locations of different Centres of AICRP on Mushroom

The mandate of AICRP (Mushroom) is to coordinate and monitor multilocation trials with improved mushroom varieties / hybrids, cultivation practices related to crop production, crop protection measures and post harvest technology, all aimed at increasing production, productivity and utilization of mushroom in the country. Major activities under the project are:

1. To conduct survey of naturally occurring wild mushrooms, catalogue the edible/ medicinal species and explore possibilities of cultivation of promising species.
2. To evaluate the promising and high yielding strains for regional adaptability.
3. To carry multi-location trial for finalization of standard production techniques for different mushrooms.
4. To explore possibility of selection of cheaper locally available substrates for mushroom cultivation.
5. To supply good quality spawn to the mushroom growers.
6. Popularization of mushroom cultivation in different agro-eco-regions.

3. TECHNICAL PROGRAMME OF WORK FOR 2013-14

I. CROP IMPROVEMENT

Expt. 01: Collection, identification and conservation of wild edible mushrooms

a) Participating centres — All centres except Murthal

b) Data to be recorded

- Rainfall and temperature data, indicate month and season of apperance
- Supply sun dried fruit bodies/spore prints along with cultures.
- Supply GPS data of the region from where mushroom was collected
- Fill the enclosed proforma as much as possible. Please send the above information within two-three weeks of collection.
- Do not send the cultures without adequate supplementary information
- **Please ensure that the culture should not be exposed to >35°C temperature during transit. If need be, any staff may be sent along with the culture and other information.**

c) Area of operation

- Each Centre may select different districts so as to cover whole region over period of time

d) Proforma for market data on mushroom collected

Sl.No.	Informations to be recorded	Observation/data
1.	Name/market/District	
2.	Date of collection	
3.	Sale price (Rs./kg)	
4.	Any association with tree(s)/ soil type etc. (interact with collector if possible)	
5.	ITK if any	
6.	Temperature range during the collection period (15-20, 20-25, 25-30, 30-35°C)	

* Report to be sent by the end of December along with colored photograph, dried specimens and cultures and for the accessions collected between Jan to March, report to be sent by 15th April.
* When ever explorations is planned, information may be sent to Dr RC Upadhyay, Principal Scientist, DMR and Dr Satish Kumar, Principal Scientist

Proforma for mushroom identification

- Specimen no.
- Date of collection
- Locality
- GPS Data
- Longitude
- Lattitude
- Altitude
- Single, in groups or connate (United)
- Habitat (Humus, wooden stumps or trees, dung, sand, or any other)
- Smell (Y/N)
- Spore print colour
- Colour
- Diameter
- Shape
- Scales / smooth/any other
- Stipe
- Central, lateral or excentric
- Colour
- Stipe size and length
- Stipe base
- Ring present or absent
- Volva present or absent
- Veil present or absent
- Basal association
- Lamellae (incase of gill fungi)Scale on cap: gills, tooth, tubes, pores
- Attachement: Free, adnasced (just tocuching stem), adnate (broad by attached), Shortly decurrent (running on the stem apex)
- Gill colour
- Gill Edges
- Edibility (edible/non-edible/ medicinal/ poisnous)
- Any Other information, ITK
- Photograohs of natural specimen showing habitat and after taking out from the soil showing cap, stem, ring, gills, volva and stem base

Expt. 02: Advanced varietal trial-1 for selected white accessions of *Agaricus bisporus*

a) Participating centres — Pantnagar, Murthal, Nauni, Pune, Ludhiana and Solan

b) Substrate
- Substrate quantity-8 kg compost/bag
- No. of replications-4 replications each with 8 bags of 10 kg compost/ replicate for each strain in RBD.

c) Strains to be evaluated
- AVT-14-01 to AVT-14-07

d) Methodology to be adopted — Short Method
- Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0,2,4,6,8 (fill)/ phase-II (6-7 days). Compost will be ready in 18 days.
- Ingredients to be used are wheat straw - 1000 kg, poultry manure-500 kg, urea-15 kg, wheat bran-70 kg, gypsum-40 kg.
- Data for compost N, colour, pH, moisture, ammonia, bulk density (kg per m^3) may be reported for each trial

e) Spawning rate to be used — 0.7% of wet compost

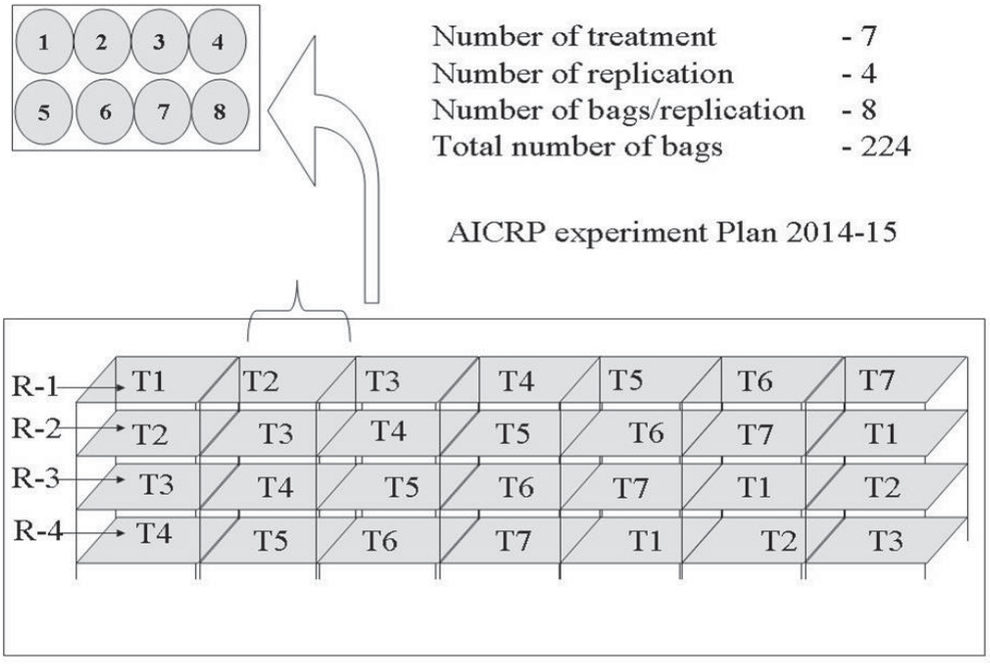
f) Data to be recorded during 4 weeks cropping
- The yield data should be recorded in tabulated form replication wise.
- The replicates should be randomized in cropping rooms in different tiers in RBD. One replicate may be kept on one tier.
- Watering should be restricted to wetting of casing material.
- Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted to 7.2-7.5 with $CaCO_3$).
- The casing material should be water leached for 8 hours before treatment with steam/chemicals. Uniform layer of casing to be applied on mycelia impregnated compost (4cm thick).
- Harvest mushrooms in button form, removing the soiled stem end with knife before weighing. Do not discard the weight of open mushrooms, but the number of mushrooms opened in each harvest should be recorded to determine the quality of the fruit body produced by a particular strain.
- Average fruiting body weight to be recorded in each treatment (Total weight of mushrooms harvested divided by No. of mushrooms harvested) to determine the quality of mushrooms produced.
- Every effort should be made to strictly adhere to the above instructions for this experiment. This will facilitate generation of uniform data for assessment and final recommendation.
- A transverse section of fruit body may be cut and may be rated on a hedonic scale of 1-5 (1 for poor and 5 for excellent). The rating may be done on the basis of gill size, pileus length, stipe thickness, firmness of fruit body etc. Photographs of TS of each strain must be supplied.

g) Environmental conditions to be maintained inside cropping room

- Spawn run: Bed Temp 24±1^{0}C, RH-90-95%, CO_2->10,000 ppm.
- Case run: Bed Temp-24±1^{0}C, RH-90-95%, CO_2 - >10,000 ppm.· Cropping: Bed Temp 16-18^{0}C, RH 80-85%, CO_2-<1000ppm

h) Bag size — 20"x24" (polythene - 150 gauge)

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; satish132@gmail.com. Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. Shwet Kamal.



Experiment design for AVT-1 of *A. bisporus*

Expt. 03: Evaluation of different bacterial isolates and effect of pre spawning of casing soil prior to pasteurizartion on survival / inoculums of *Mycogone perniciosa*

a) Participating centres — Pantnagar, Murthal, Nauni, Pune, Ludhiana and Solan

b) Substrate

- Substrate quantity- 8 kg compost/bag
- No. of replications-3 replications each with 4 bags of 10 kg compost/ replicate for each strain in RBD.

c) Strains

- U-3

d) Treatment

- Pre-spawning of casing soil mixture with grain spawn, liquid spawn, spawn run compost and grinded mushroom and incubation at 25+_C for 10 days and then pasteurization
- **Pre-spawning treatments: (Treatments1-4)**
- i) Grain spawn @ 0.7% + Mycogone @ 0.1%
- ii) Liquid spawn @ 0.5 % + Mycogone @ 0.1%
- iii) Spawn run compost @ 2% + Mycogone @ 0.1%

- iv) Grinded mushroom 0.5% + Mycogone @ 0.1%
- **Treatments after casing (Treatments 5-9)**
- v) B-9 @ 10^6-10^7cfu/ml/bag+ Mycogone @ 0.1%
- vi) B-18 @ 10^6-10^7cfu/ml/bag+ Mycogone @ 0.1%
- vii) B-18 + B-9 @ 10^6-10^7cfu/ml/bag+ Mycogone @ 0.1%
- viii) B-20 @ 10^6-10^7cfu/ml/bag+ liquid spawn @0.5% Mycogone @ 0.1%
- B-9+B-18+B20 @ 10^6-10^7cfu/ml/bag (uninoculated)

Treatment 10 (Control-1)- uninoculated pasteurized casing soil

Treatment 11 (Control-2)- Fresh casing soil (unpasteurized)

Treatment 12 (Control-3)- Fresh pasteurized inoculated (Mycogone @ 0.1) casing soil

e) Spawning rate to be used = 0.7% of wet compost wt

f) Replication = 4 (4 bags each)

g) Data to be recorded during 4 weeks cropping
- Efficacy/ yield loss/ disease incidence

h) Bag size 20"x24" (polythene - 150 gauge)

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; vpsharma93@gmail.com . Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. Shwet Kamal.

- pH of the casing soil may be adjusted to 7.5 with $CaCo_3$
- Layout as per AVT on button

Expt. 04: Advanced varietal trial for strains of Paddy Straw Mushroom, *Volvariella volvacea*

a) Participating centres Coimbatore, Bhubaneshwar, Ranchi, Ludhiana

b) Substrate
- 1.5% $CaCO_3$ mixed water soaked for 12-14 hours paddy straw bundles (45 cm ´ 15 cm)

c) Method
- Bundle method (5 bundles ´ 4 layers + 2 bundles opened at the top) with plastic sheet covering for whole cropping period (tight during spawn run and loosely during cropping) with intermittent water spray on mushroom beds

d) Strains 4

e) Replication
- 4 replications each with 3 beds for each strain

f) Data to be recorded
- Substrate moisture
- Substrate temperature during spawn run, pinning and cropping
- Relative humidity during cropping
- Time taken for mycelial colonization of the substrate
- Time taken for first harvest (days post-spawning)

- Mushroom yield weekly (kg/100 kg dry substrate) for 2 weeks cropping period
- Average fruiting body weight
- Incidence of diseases/insect-pests, if any
- Fruiting body quality of unopened mushroom (length, breadth, shape, colour and dry weight)
- Enclosure of Anova with data sheet

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; shwetkamall@gmail.com; ahlawat22op@gmail.com. Reporting of the experiments and results to be done to and cultures may also be obtained from Dr. O P Ahlawat.

Expt. 5 Standardization of the cultivation technology of low temperature requiring *Volvariella* sp.

a) Participating centres — Raipur, Coimbatore, Bhubaneswar, Ranchi, Ludhiana, Samastipur

b) Substrate
- 1.5% $CaCO_3$ mixed water soaked paddy straw bundles (45 cm ´ 15 cm) for 12-14 hours

c) Method
- Bundle method (5 bundles ´ 4 layers + 2 bundles opened at the top) with plastic sheet covering for whole cropping period (tight during spawn run and loosely during cropping) with intermittent water spray on mushroom beds

d) Strains
- 1 strain of *Volvariella bombycina* + 1 high yielding strain of *V. volvacea*

e) Replication
- 5 replications each with 4 beds for each strain

f) Cropping conditions
- To be conducted in the month of November-December or February-March (spawn run at 28 ± 2°C, cropping at 24 ± 2°C, RH 80-85%)

g) Data to be recorded
- Substrate moisture
- Substrate temperature during spawn run, pinning and cropping
- Relative humidity during cropping
- Time taken for mycelial colonization of the substrate
- Time taken for first harvest (days post-spawning)
- Mushroom yield weekly (kg/100 kg dry substrate) for 2 weeks cropping period
- Average fruiting body weight· Incidence of diseases/insect-pests, if any
- Fruiting body quality of unopened mushroom (length, breadth, shape, colour and dry weight)
- Shelf life of fruit bodies on storage at 4 ± 2°C in refrigerator
- Organoleptic test of the popular mushroom based dish of the region
- Enclosure of Anova with data sheet

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; satish132@gmail.com; ahlawat22op@gmail.com. Reporting of the experiments and results to be done to and cultures may also be obtained from Dr. O P Ahlawat.

Expt. 06: Evaluation of high yielding varieties/strains of Oyster Mushroom (*Pleurotus* spp)

a) Participating centres — Pune, Raipur, Pusa, Pasighat, Pantnagar, Vellayani, Coimbatore, Bhubaneshwar, Udaipur, Hisar, Ranchi, Barapani

b) Substrate
- Wheat straw or paddy straw
- Substrate treatment: Chemical pasteurization (7.5 g Bavistin and 125 ml Formalin in 100 lt water)
- pH to be adjusted to 7.50 with $CaCO_3$
- Substrate quantity: 1 kg dry wt. (with 70 % moisture)/bag
- No of replications: 5 replication each with 6 bags and all bags of one replication to be placed in one tier (RBD)

c) Containers — Polybag (45x30cm)

d) Season for laying trials — Two trials of all the strains

1. Temp range - $\leq$20°C (Nov.- Dec.)
2. Temp range - $\geq$30°C (Sept.- Oct)

e) Spawn rate — 500g spawn for 5 kg dry substrate

f) Varieties — Six new strains of *Pleurotus* – PL-14-01 to PL-14-06

g) Data to be recorded
- Days taken for spawn run.
- Days taken for pinhead formation.
- Yield data (number and weight up to 4 weeks).
- Time taken for I, II and III flush
- Data of maximum and minimum temp and dry and wet bulb thermometer readings of the morning 10.00AM must be supplied with yield data. Results will not be considered without this data.
- Fruit body observations of individual hybrid strain

  ➨ Pileus size, colour, stipe length, stipe thickness, organoleptic tests - liking of the consumers and coloured photograph of each strain.

  ➨ The data on pileus and stipe size/thickness are to be recorded for at least 10 fruit bodies
- Pest and disease incidence (as per proforma)
- Photographs of each hybrid

h) Information to be provided
- Substrate used and substrate preparation method (**Important**)
- Date of spawning
- Date of opening bags
- Max. and minimum temperature and RH% in the cropping rooms
- (Separate sheet is enclosed for recording)
- Daily yield record (replication wise)

Table 1. Cropping room temperature and RH (%) Data

Date	Temperature (°C)		RH (%)	Remarks (bag opening, pinhead formation, 1st harvest, etc)
	Maximum	Minimum		

Table 2. Mushroom yield data; Substrate (wheat or paddy straw)

Strain	Replication	Yield (g) of each bag	Total Yield (g)
PF-1	R-1 ….R5		

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; shwetkamall@gmail.com; rc_upadhyay@hotmail.com. Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. R. C. Upadhyay.

Expt. 07: Advanced varital trial for high yielding strains of Milky mushroom (*Calocybe indica*)

a) Participating centres — Coimbatore, Raipur, Udaipur, Samastipur, Pantnagar and Murthal

b) Strain — CI-14-01 to CI-14-05

c) Substrate — Wheat straw/paddy straw

d) Supplement

e) Method of substrate preparation — Chemical sterilization

f) Spawn rate — 4% (on wet weight basis)

g) No. of replication — 4 replication of 6 bag each

h) Bag size — 5 kg wet weight

h) Observation to be recorded — Days to spawn run; days to first harvest, no. of fruit bodies and total yield per bag; total yield per 100 kg dry substrate

i) Production technology to be followed

- Treat the substrate with 75 ppm bavistin and 500 ppm formaline for 16-18 h
- Method of spawning – layer spawning 4% wet weight basis
- Spawn run temp – 25-32°C; RH – 80%; Light – Nil
- Takes 20 days for substrate colonization and then casing is to be done.
- Casing – 75% soil and 25% sand
- Thickness – 3-4 cm; pH – 7.8-7.9 to be adjusted with chalk powder
- Casing autoclaved or treated with formaline (2%) about a week in advance.
- Temp – 30-35°C ; RH – 80-90% maintained throughout cropping cycle
- Cropping – It takes about 10 days for case run and then minimum 3-4 air exchanges per hour required.

- Light to be provided for maximum duration during entire cropping cycle.

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; satish132@gmail.com; sharma_vp93@rediffmail.com. Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. V P Sharma.

II. CROP PRODUCTION

Expt. 08: Total indoor compost production using thermophilic fungi

a) Participating centres — Ludhiana, Murthal, Nauni, Solan, Pantnagar

b) Substrate

Wheat straw	- 1000 kg
Poultry manure	- 700 kg
Wheat bran	- 70 kg
Urea	- 12 kg
Gypsum	- 40 kg*

Cold N level should be 1.6 to 1.75

c) Inoculum

- Inoculum needed: *Scytalidium thermophilum* (X-21 strain) + *Humicola Insolens* (I-33) @ 0.4% on dry wt. basis of the straw i.e. 2.0 kg each
- Inoculum has to be added at 2 stages·Culture will be provided by DMR, Solan
- Inoculum to be grown on wheat grains (usual spawn bottles with sterilized wheat grain) and inocubated at 45°C for 7-10 days
- Later mix half of both the inoculum on a polythene sheet. Take two buckets of water and pour both the inoculum in it. Stir it properly with hands so that spores of fungi are distributed in water properly.
- Inoculum solution is now ready.

d) Method of compost preparation

- 0 day : Properly wet wheat straw and bring it up to 75% moisture level. Later thoroughly mix the ingredient in to it along with half of inoculum and make a heap of 4 ft height
- +1 day: break open the heap, add water if required, mix the ingredients properly, again make a heap (temp around 58-60°C)
- +2 day: Again turn the compost ingredient and make a heap (temp 62-65°C)
- +3 day: Again turn the compost ingredient and make a heap (temp 70°C)
- +4 day: Transfer the entire mass to phase-II tunnel after adding the left over half of the inoculum and equalize at 45-48°C)
- +5 day: Maintain the compost temp at 45-52°C (pre-pasteurization conditioning)
- +6 day: -do-
- +7 day: Kill at 59°C for 6 h (either through self heat generation or through steam), later post pasteurization conditioning (POPC) at 48-52°C.

- +8 day: Post pasteurization conditioning (POPC) continues
- +9 days: POPC
- +10 days: POPC and cool down at night
- +11 day : Spawn

* Minimum 10% fresh air during entire operation even during killing

* Spawning can be done on 10th day if ammonia below 10 ppm

e) Substrate quantity — As in expt-2

f) Spawn rate — As in expt-2

g) Strain to be used — U-3

h) Temperature for spawn run and cultivation — As in expt-2

i) Relative humidity — As in expt-2

j) No. of replication — 16 replication of 10 bags each

k) Control — May be compared with average yield of U-3 in other trial for same cropping period (The data of 50 bags each should be submitted for unpaired T test analysis)

l) Casing — As in expt-2

m) Observation to be recorded:

- Physical parameter of compost like pH, Nitrogen, Moisture etc
- Quantity of total compost produced
- Days required to complete phase-II
- Yield per 100 kg compost
- Time (days) taken for spawn run
- Time (days) taken for case run
- Time (days) taken for primordial formation
- Total No. of fruit bodies/bag
- Total mushroom yield/bag
- Fruit body weight
- Disease incidence

n) Cost benefit ratio

*** The compost, not used in the trial may be given to farmers for farmer's field trial.**

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: directordmr@gmail.com; satish132@gmail.com . Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. OP Ahlawat

Expt. 9: Evaluation of zero energy poly tunnel technology

a) Participating centres — Hisar, Murthal, Pusa, Solan

b) Strain — U-3

c) Substrate and Supplement

Wheat straw - 1000 to1200 kg

Chicken manure - 600 kg

Wheat bran - 100 kg

Gypsum - 76 kg

Urea - 24 kg

d) Method of substrate preparation

Pre-wetting : Two days

0 day : Mixing of fine ground chicken manure, wheat bran, urea and gypsum for 6-8 h and Pile formation using ZEPT structure and covering with polythene cover

1st -5th day : compost pile as such

: First three days, fully covered with polythene sheet (1st pasteurization, average temperature 66-78°C)

: fourth day onwards, side cover need to be opened (1st conditioning, average temperature 50-60°C)

6th day: first turning; pile formation using ZEPT structure and polythene cover

6th – 10th day : compost pile as such

: Seventh and eighth day, fully covered with polythene sheet (2nd pasteurization, average temperature 60-68°C)

: 9th day onwards, side cover need to be opened (2nd conditioning , average temperature 50-56°C)

11th day : Second turning; pile formation using ZEPT structure and polythene cover without closing side cover : (3rd conditioning, average temperature 48-52°C)

13th day: pile break up and over night cooling

14th day : Spawning

e) Spawn rate

0.7% of wet compost

f) No. of replication

3 replications each with 4 bags of 10 kg

g) Bag size

8 kg compost per bag

h) Production technology to be followed

- The yield data should be recorded in tabulated form replication wise.
- The replicates should be randomized in cropping rooms in different tiers in RBD.
- Watering should be restricted to wetting of casing material.
- Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted in the range of 7.2-7.5 with $CaCO_3$).
- The casing material should be water leached for 8 hours before treatment with steam/chemicals. Uniform layer of casing to be applied on mycelia impregnated compost, with use of 4cm wide metal rings (4cm thick).

- Harvest mushrooms in button form, removing the soiled stem end with knife before weighing. Do not discard the weight of open mushrooms.
- Every effort should be made to strictly adhere to the above instructions for this experiment. This will facilitate generation of uniform data for assessment and final recommendation.

h) Observation to be recorded

- Composting: Daily temperature profile
- Finished compost
- Moisture content
  - pH
  - EC
  - N
- Spawn run
  - Days required for spawn run completion
  - Presence of pest and disease if any
- Case run
  - Days required for case run completion
  - Presence of pest and disease if any
- The number of mushrooms opened in each harvest should be recorded to determine the quality of the fruit body produced by a particular strain.
- Average fruiting body weight to be recorded in each treatment (Total weight of mushrooms harvested divided by No. of mushrooms harvested) to determine the quality of mushrooms produced and ultimately the dry weight of the mushroom.
- A transverse section of fruit body may be cut and may be rated on a hedonic scale of 1-5 (1 for poor and 5 for excellent). The rating may be done on the basis of gill size, pileus length, stipe thickness, firmness of fruit body etc. Photographs of TS of each strain must be supplied.

Design of the Structure

- For design either visit DMR

IV. EXTENSION ACTIVITIES

1. Organization of at least 3 training programmes of 3-7 days duration each preferably in March, August and October months of the year.
2. Involvement of women in training programmes to empower them and help in creation of self help groups and candidates from lower income group.
3. Organization of two filed days at the farm of the progressive farmer.
4. Active participation in Workshops, Kisan-mela and Demonstration etc.
5. Development of mushroom museum
6. Supply of quality mushroom spawn to mushroom growers mentioning the quantity.

7. Feedback on diseases of respective areas
8. Impact analysis of training programmes and spawn supply data in kg instead of packet
9. Publication of Bulletins in regional languages
10. Spawn sold in each quarter must be intimated in quarterly report.

Notes:

1. **The experiments may be laid by following proper randomization and the randomization plan may be attached with results.**
2. **The daily temperature and humidity data may be submitted in excel sheet.**
3. **The replicationwise rough data may be submitted within 15 days after completion of the trial.**
4. **Cultures supplied are coded differently each year. Please do not use the old cultures for trials. Material transfer agreement will be supplied and the same may be returned after signing.**
5. **Please go through the contents above and in case of any modifications or suggestions, you may write to directordmr@gmail.com .**
6. **Incase of no comments from your side, the technical programme may be treated as final.**

4. RESEARCH PROGRESS

1. CROP IMPROVEMENT

1.1 Advanced varietal trial-1 for selected white accessions of *Agaricus bisporus*

This experiment was conducted on short method pasteurized compost at Pune, Pantnagar, Nauni, Ludhiana, Solan and Murthal. The sample size of the experiment was four replication of ten bags each of 10 kg compost in RBD. The parameters of compost i.e. pH, Nitrogen, moisture and colour were also recorded. In trials conducted using the long method compost, the maximum yield of 21.28 kg per 100 kg of compost was recorded in the strain AVT-14-06 at Pune Centre followed by 20.66 kg at Nauni centre. The strain AVT-14-01 and AVT-14-07 also performed very well at Nauni and Pune centres. Strain AVT-14-01 gave highst yield of 17.90kg at headquarters followed by AVT-14-06. Overall all the strains have performed well at Pune centre. On the basis of average yield, maximum yield was recorded in the strain AVT-14-06 (Table 4.1).

Fig. 4.1. Advance varietal trial of white button mushroom

Table 4.1. Yield of different strains of white button mushroom on long method compost in four weeks cropping

***A. bisporus* strain**	**Pantnagar**	**Ludhiana**	**Murthal**	**Pune**	**Solan**	**Nauni**	**Average**
AVT-14-01	12.05	13.5	10.80	17.17	17.90	20.50	15.32
AVT-14-02	17.00	10.6	9.71	18.03	14.10	7.81	12.88
AVT-14-03	16.55	12.8	5.74	17.46	13.34	17.78	13.95
AVT-14-04	14.79	17.1	8.98	16.96	13.11	10.67	13.60
AVT-14-05	20.69	11.0	8.09	18.17	16.27	13.38	14.60
AVT-14-06	20.36	18.3	19.16	21.28	17.01	20.66	19.46
AVT-14-07	12.05	19.9	18.16	19.05	14.65	17.60	16.90
U-3 Control	-	14.5	-	18.82	-	-	16.66
CD (0.05)	**0.9**	**1.2**		**0.81**	**1.22**	**0.82**	

The time taken in first harvest (days post casing) was in the range of 8.35-24 days. The lowest first harvest time (8.35 days) was recorded at Pantnagar in AVT-14-01. Overall the lowest first harvest time was recorded in U-3 control and AVT-14-07 (Table.4.2).

Friut body weight also varied at different centres and was recorded maximum (33 g) at Murthal centre

Fig.4.2. Cross section of fruit body of AVT-14-01

in the strain AVT-14-02 and AVT-14-04 and AVT-14-05 (31 g) (Table 4.2). At headquarters the average fruit body weight ranged between 13.5-15.8 g in all the strains. On the basis of average lowest time taken for first harvest was recorded in strain AVT-14-05, whereas, maximum fruit body weight of 17.5 g was recorded in the strain AVT-14-04.

Table 4.2. Time taken to first harvest and average fruit body weight in *A. bisporus* strains

A. bisporus	**Ludhiana**		**Pantnagar**		**Pune**		**Nauni**		**Solan**		**Murthal**		**Average**	
strain	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**
AVT-14-01	23	11.8	21	8.3	21	14.4	20	10.9	14	14.0	19	30	19.7	14.9
AVT-14-02	22	12.5	24	16.4	21	13.7	21	10.2	16	13.8	20	33	20.7	16.6
AVT-14-03	22	15.8	18	13.2	20	13.6	21	9.9	16	15.8	19	30	19.3	16.4
AVT-14-04	21	14.2	24	12.3	21	15.1	23	9.6	18	14.1	9	31	19.3	16.1
AVT-14-05	18	15.5	23	17.2	20	14.4	21	11.0	15	13.8	8	31	17.5	17.2
AVT-14-06	19	12.9	19	12.8	19	13.9	20	11.6	-	-	19	29	19.2	16.0
AVT-14-07	19	14.8	21	6.6	19	13.4	20	10.5	15	13.5	18	29	18.7	14.6
U-3 Control	20	13.0	-		19	14.5			15	14.0			18.0	13.8
CD (0.05)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**—**

a. First harvest (days post casing); b. average fruit body wt (g)

The compost parameters recorded at various centres have clearly indicated that the pH of the compost ranged from 7.1 to 7.7 while nitrogen percent varied from 1.76 to 2.2. The moisture percent varied from 58- 67% (Table 4.3). Colour of compost was invariably dark brown at all the centres. The parameters indicated that there was slight variation in the values but overall the parameters were well within the recommended range.

Table 4.3 Compost parameters for short method compost

Centres	**pH**	**Nitrogen (%)**	**Moisture (%)**	**Colour**
Pune	7.2	1.80	65	Dark brown
Pantnagar	7.1	1.98	66	Dark brown
Murthal	7.5	1.76	65	Dark brown
Ludhiana	7.4	2.2	67	Dark brown
Solan	7.7	2.1	58	Dark brown

1.2 Evaluation of different bacterial isolates and effect of pre spawning of casing soil prior to pasteurization on survival/ inoculums of *Mycogone perniciosa*

This experiment was allotted to Pantnagar, Murthal, Nauni, Ludhiana, Solan and Hisar centres. The results at various centres are given in Table 4.4. At Nauni centre, treatments such as treatment No 5, 6, 7, 8, 9 and 10 proved effective with disease incidence varying from 0.0 to 30%. In the treatments No 1, 2, 3, 4, 11 and 12, 100% loss in the yield was recorded. At Solan centre, lowest disease incidence was recorded in treatment No 8 followed by 5. However, treatment 1, 3, and 6 also proved effective. Yiled in different treatments varied from 11.20 - 12.2kg. At Ludhiana and Pantnagar centres, the most effective treatment against *Mycogone* was treatment no 9 followed by 6 and treatment number 7 followed by 9, respectively. The treatments were not found very effective at Pantnagar centre.

Table. 4.4. Effect of different bacterial isolates and effect of pre spawning of casing soil prior to pasteurization on survival/ inoculums of *Mycogone perniciosa*

Treat	Ludhiana		Pantnagar			Nauni		Solan	
	A	B	A	B	C	B	C	A	C
1	-	-	-	-	-	100	100	10.80	-25.51
2	-	-	-	-	-	100	100	6.80	-53.10
3	-	-	-	-	-	100	100	11.20	-22.75*
4	-	-	-	-	-	100	100	8.0	-44.82
5	5.7	43.9	0.23	98.69	99.12	40.50	30.00	12.2	-15.86*
6	8.3	39.8	0.05	99.71	99.93	35.00	29.13	12.2	-20.68*
7	-	-	1.03	94.02	96.04	29.43	23.5	11.5	-43.44*
8	6.5	53.9	0.20	98.83	99.12	35.00	40.0	8.2	-11.72
9	9.5	39.0	0.68	96.06	97.5	0.00	0.00	12.8	-
10	14.8	0.0	17.15	-	0	0.00	0.00	14.5	-53.10
11	-	-	-	-	-	20.00	22.00	6.8	-
12	3.7	59.5	0.03	99.85	99.93	100	100	2.5	-
CD (0.5)	-	-	-	-	-	-	-	1.3	-

A = Yiled (kg/q); B= Yield loss (%) over control; C = Disease incidence (%)

1.3 Advance varietal trial for strains of Paddy Straw Mushroom, *Volvariella volvacea*

The trial was assigned at four centres and a total of six strains of *Volvariella volvacea* were tested. The biological efficiency of various strains varied in the range of 4.24 to 21.87 kg /100 kg of dry substrate at various centres in different strains. The maximum yield of 21.87 kg/100 kg of dry substrate was recorded in strain Vv-14-02 at Solan. It was also recorded that the maximum biological efficiency for all the test strain was achieved at the Coimbatore and Bhubnehwar centres. The minimum biological efficiency was recorded in Vv-14-03 at Solan centre with an average yield of 9.9 kg /100 kg of dry substrate. Overall average showed that the maximum BE (19.47 kg) was recorded in Vv-14-02 strain while the minimum BE (9.9 kg) was in strain Vv-13-03 (Table 4.5).

Table. 4.5. Yield of different strains of Paddy Straw Mushroom, *Volvariella volvacea* (kg/100kg of dry substrate

Strain	Coimbatore	Ludhiana	Bhubaneswar	Solan	Average
Vv-14-01	17.47	7.38	15.61	-	13.48
Vv-14-02	19.84	17.66	18.52	21.87	19.47
Vv-14-03	12.76	-	12.70	4.24	9.9
Vv-14-04	15.32	15.70	13.36	-	14.79
Vv-14-05	10.68	8.90	-	21.14	13.57
Vv-14-06	-	-	-	6.23	-
Vv-11	-	11.05	-	-	-
CD(0.05)	**-**	**-**	**2.35**	3.07	**-**

The average fruit body weight varied at different centres with a maximum of 21.20 g at Coimbatore centre in the strain Vv-14-02 while the minimum fruit body weight was recorded to be 8.9 g at Ludhiana centre in the strain Vv-14-01. All the strains have recorded the maximum fruit body weight at Coimbatore centre followed by Bhubaneshwar centre. The maximum fruit body weight recorded at Bhubaneshwar centre was 20.84 g in strain Vv-14-04. Overall average showed that the maximum fruit body weight (16.71 g) was recorded in strain Vv-14-03 while minimum (13.07 g) in Vv-14-01 strain.

The minimum time taken for the first harvest was 10.2 days in strain Vv-14-02 at Coimbatore centre. The overall average also indicated the minimum time taken for the first harvest was in strain Vv-14-02 while the maximum time in strain Vv 14-03 (Table 4.6).

Table 4.6. Average fruit body weight (g) and time taken to first harvest in strains of paddy straw mushroom

Strain	Coimbatore		Bhubaneswar		Ludhiana		Solan		Average	
	a	b	a	b	a	b	a	b	a	b
Vv-14-01	20.40	11.1	9.92	12.40	8.9	16	-	-	13.07	13.16
Vv-14-02	21.20	10.2	14.80	11.40	11.8	12	13.37	13.6	15.29	11.8
Vv-14-03	18.10	12.9	15.98	11.73	-	-	16.05	20.33	16.71	14.98
Vv-14-04	19.80	11.4	20.84	12.50	9.2	12	-	-	16.61	11.96
Vv-14-05	18.80	12.8	-	-	10.7	14	12.45	13.6	13.98	13.46
Vv-14-06	-	-	-	-	—	-	13.59	20.0	-	-
Vv-11	-	-	-	-	9.3	13	-	-	-	-
CD (0.05)	**-**	**-**	**2.28**	**0.59**	**-**	**-**	**1.93**	**2.49**	**-**	**-**

a: average fruit body wt (g); b: time taken for first harvest (days)

1.4 Standardization of the cultivation technology of low temperature requiring *Volvariella* sp

The trial was assigned at six centres and one strains of *Volvariella bombycina* was tested and yield was compared with one high yielding strain of tested *Volvariella volvacea* (table 4.7). At Ludhiana centre paddy straw bundles (each 45cm x 15cm weighing 500g) were soaked for 12-14h in 1.5% $CaCO_3$ mixed water to a moisture level of 65-67%. The spawn of six *V. bombycina* strain VB was prepared on wheat grains. Spawn run was complete in 12d of spawning and first harvest was made after 15 days to give 7.92 kg mushrooms/qtl dry straw. Fruit bodies were campanulate with 3-5cm long stipe and 2-4cm pileus diameter. At Bhubneshwar centre two strains of *Volvariella* including one of *V. bombycina* were grown with 12 replications each having two beds on November 24, 2014. However, mycelia colonization could not be observed in any of the beds even 15 days after spawning. Hence, no valid conclusion could

Table. 4.7 Testing of low temperature requiring paddy straw mushroom, *V. bombycina*

Location	Strains	Spawn run (d)	First harvet (d)	Yieldkg/q dry sub.	Av. Fruit body wt
Ludhiana	VB-14-06	12	15	7.92	6.8
	Vv-14-02	11	14	10.12	8.7
Coimbatore	VB-14-06	8.4	*	*	*
	Vv-14-02	6.8	11.6	15.31	22.4
Solan	VB-14-06	-	22.09	16.52	20.35
	Vv-14-02	-	21.72	21.73	39.55

* No fruiting

be drawn out of the trial under report. The cultures have been maintained and it will be repeated during the winter season of 2015. At Coimbatore centre no pin heads and fruiting bodies were observed. Only one rudimentary fruting body was observed in disposed bags after 35 days. At Solan centre, yield of 16.52 kg was recorded in *V. bombycina* which was significantly low as compared to *Volvariella volvacea.* Average fruit body weight of 20.35g was recorded in case of *V. bombycina* as compared to 39.55 g in case of *Volvariella volvacea.* Not much difference was recorded in time taken for first harvest.

Fig.4.3. Rudimentary fruiting body of *Volvariella bombycina* Vb -14-06 observed on disposed beds at Coimbatore

1.5 Evaluation of high yielding varieties/strains of Oyster Mushroom (*Pleurotus* spp)

This trial was conducted at 10 different centres. A total of six high yielding strains of *Pleurotus* species were under evaluation trial (Table 4.8). At Coiombatore Centre, strain PL-14-03 gave the hihest BE of 131.27% whereas, strain Pl-14-05 at Raipur, strain Pl-14-02 at Barapani, Strain Pl-14-03 at Vellayani and Udaipur, strain Pl-14-01 at Bhubneshwar an Ranchi, strain Pl-14-06 at Pusa, Pasighat and Pune performed best among all the strains tested.. On an average basis strain Pl-14-03 gave highest yield.

Table 4.8. Strain evaluation of oyster mushroom species

Location	Strains						
	Pl-14-01	**Pl-14-02**	**Pl-14-03**	**Pl-14-04**	**Pl-14-05**	**Pl-14-06**	**CD (5%)**
Solan	54.16	36.66	75.83	33.91	32.08	36.25	**16.82**
Coimbatore	101.61	124.55	131.27	106.22	100.27	106.72	**—**
Raipur	56.52	49.94	45.80	56.58	84.58	69.16	**05.95**
Barapani	41.78	106.70	72.98	58.04	58.40	41.78	**22.9**
Vellayani	22.10	53.70	65.10	14.70	52.60	40.80	
Bhubneswar	106.78	105.00	72.66	65.22	67.00	75.74	**12.21**
Pusa	80.01	61.14	83.34	69.14	72.00	94.78	**02.47**
Ranchi	69.15	46.50	68.38	60.12	48.25	50.37	
Udaipur	67.58	70.14	73.96	55.66	46.46	NF	**06.20**
Pasighat	37.60	46.60	-	38.00	-	57.40	**37.6**
Pune	93.83	59.00	-	72.52	82.74	99.73	**09.72**
Pantnagar	44.86	21.81	21.19	16.42	18.33	18.18	**07.03**
Average	**65.62**	**67.73**	**70.52**	**55.69**	**63.06**	**65.47**	

Fig. 4.4. Evaluation of high yielding varieties/strains of Oyster Mushroom (*Pleurotus* spp)

At Raipur Centre, strain Pl-14-03 took maximum time of 38 days, whereas, Pl-14-02, Pl-14-01, Pl-14-05, Pl-14-02 and Pl-14-06 took maximum time at Bhubneshwar, Pusa, Vellayani, Pune and Barapani Centre, respectively (Table 4.9). On an average strain Pl-14-04 took maximum time of 31.36 days. Similarly fruit body weight varied at different Centres (table 4.10). Maximum fruit body weight of 38.33g was recorded in strain Pl-14-03, Pl-14-02, Pl-14-01, Pl-14-06 was recorded at Raipur, Bhubnehwar, Pune, Vellayani and Barapani centre, respectively. Average fruit body weight of 15.50 g was recorded in the strain Pl-14-05.

Table 4.9. Time taken for first harvest in different strains of *Pleurotus*

Strain/ Hybrid	Pantnagar	Raipur	Bhubneswar	Pusa	Vellayani	Pune	Pasighat	Barapani	Average
Pl-14-01	19	35.33	25.40	27.00	18	23	30	50.6	29.90
Pl-14-02	17	34.66	35.56	25.00	14	37	30	39.6	25.88
Pl-14-03	14	38.33	29.72	26.00	24	-	-	29.2	29.45
Pl-14-04	18	33.66	29.12	25.00	21	27	30	53.8	31.36
Pl-14-05	20	24.66	28.26	25.00	33	26	30	52.4	31.33
Pl-14-06	20	31.66	27.73	20.00	26	23	30	54.0	30.34
CD 5%		**1.6**	0.48					3.9	

Table 4.10 Average fruit body weight in different strains of *Pleurotus*

Strain/Hybrid	Pantnagar	Raipur	Bhubaneshwar	Udaipur	Pune	Barapani	Average
Pl-14-01	7.99	11.50	5.39	6.99	5.89	30.12	11.98
Pl-14-02	8.03	9.60	9.77	6.42	11.2	29.02	13.20
Pl-14-03	3.76	8.50	8.10	7.89	-	10.0	8.62
Pl-14-04	7.97	19.50	8.12	5.34	13.18	30.44	15.31
Pl-14-05	7.98	22.00	8.33	6.57	10.80	29.84	15.50
Pl-14-06	8.02	10.50	8.84	-	6.08	33.09	14.62
CD 5%			0.76			10.2	

1.6 Advanced varietal trail for high yielding strains of milky mushroom

This trial was conducted at five different Centres and six strains of milky mushroom were evaluated. At Solan Centre, strain CI-14-03 gave highest yield of 57.86 kg followed by CI-14-02. At Coimbatore centre maximum yield of 117.34 was recordrd in the strain CI-14-04 followed by CI-14-05 and CI-14-03. Strain CI-14-04, CI-14-01, performed best at Udaipur, Murthal and Samastipur, respectively (Table 4.11). At Pantnagar centre the maximum yield (95.43%) was obtained in the strain CI-14-04. On an average maximum yield of 70.16 kg was recorded in strain CI-14-04.

Table 4.11 Advanced varietal trail for high yielding strains of milky mushroom (kg/100 kg dry sub)

Strain	Pantnagar	Solan	Coimbatore	Udaipur	Samastipur	Murthal	Average
CI-14-01	77.35	32.80	91.26	32.56	50.0	29.50	52.25
CI-14-02	57.63	42.13	99.66	58.66	32.0	27.75	52.97
CI-14-03	50.61	57.86	102.50	46.02	31.0	21.50	51.58
CI-14-04	95.43	21.66	117.34	86.80	41.0	58.72	70.16
CI-14-05	51.15	34.80	109.66	26.96	18.0	NF	48.11
CI-14-06	39.05	-	88.02	NF	41.0	NF	56.02
CD (0.05)	**2.16**		**1.79**	**2.09**		**4.47**	

2. CROP PRODUCTION

2.1 Total indoor compost production using thermophilic fungi

The trial was assigned to five different centres namely, Nauni, Murthal, Ludhiana, Pantnagar and Solan. A new method of compost preparation inside the tunnel was developed at DMR, Solan, which does not cause any air pollution and any noxious gas emission. The technology as such was put for multilocation trials alongwith traditional short method technology as check. At Nauni Centre, maximum yield off 19.57 kg was recorded as compared to 16.89 kg in traditional short method. At Ludhiana and Pantnagar centres total indoor compost yielded 14.6 and 14.14 kh/100kg compost, respectively while control short method technique yielded 15.8 and 17.78 kg/ 100kg compost, respectively (Table 4.12).

The analysis of the total indoor compost at different centres showed that all the parameters varied in a range like pH (7.3-7.7), nitrogen (1.68-2.8%) and moisture (57-69%) (Table 4.13). This analysis showed that the compost made by Indoor method of composting tend to have more moisture and nitrogen content.

Table 4.12 Yield of white button mushroom by total indoor composting technology

Treatment	Mushroom yield (kg/100kg compost) at different centres					
	Nauni	Murthal	Ludhiana	Pantnagar	Solan	Average
Total Indoor composting using thermophile	19.57	-	14.6	14.17	-	16.11
Traditional short method compost	16.89	-	15.8	17.78	-	16.82
CD (0.05)						

Table 4.13 Compost parameters in total indoor compost

Centres	pH	Nitrogen (%)	Moisture (%)	Colour
Ludhiana	7.6	2.5	67.0-69.0	Dark brown
Murthal	-	-	-	-
Pantnagar	7.4	1.45	67.5	-
Nauni	7.3	1.68	57	Black

The pH remains in acceptable range. The low yields obtained in the experiment may be due to the higher moisture content in the compost.

2.2 Evaluation of zero energy poly tunnel technology

The trial was assigned to four different centres i.e. Hisar, Murthal, Pusa and Solan . A new method of compost preparation using perforated pipes inside the compost pile was developed at DMR, Solan, which do not cause any air pollution by using passive aeration. Result indicated that ZEPT compost supported the growth of *Agaricus bisporus* (U3), colonized the compost within 15 days and took 27-30 days for 1st harvest with 25 kg/100 kg compost at Pusa. The ZEPT method was more suitable under Bihar condition for small farmers (Up to 100 Q straw). As regards Benefit cost ratio, the labour requirement is just ½ of the long method of composting with higher yield. At Hisar Centre, maximum yield off 17 kg /100kg compost was recorded against control short method compost (18.1 kg/100kg compost). Overall average yield showed 11.38 kg /100 kg compost in indoor composting technology (Table 4.14).

Fig.4.5. Zero energy polytunnel technology of compost preparation

Table 4.14. Evaluation of zero energy poly tunnel technology (kg/q)

Strain	Hisar	Murthal	Pusa	Average
ZEPT	17.0		25.00	
control	18.1		-	

5. COLLECTION, IDENTIFICATION AND CONSERVATION OF WILD EDIBLE GERMPLASM FROM LOCAL MARKET

Different Centres have reported the collection of specimens of wild mushrooms during the year and about 137collections have been deposited at the DMR Gene Bank with passport data. During the last workshop of AICRPM, it has been decided that different mushrooms collected and consumed locally by the people of different regions will be collected and we should take advantage of the ITK available on mushrooms and utilize this germplasm instead of going for random collection of wild germplasm. In this regard it was decided that the Centres will survey the local markets for collecting the germplasm in addition to forest forays, collect the data, make cultures and deposit these with DMR along with their photographs, dried samples and passport data. The outcome has been summarized in table 5.1.

Table 5.1. Germplasm and passport data collected and supplied to DMR, Solan by AICRP Centres

Centres	No. of mushroom species collected	Date of deposition	Accession No obtained
ICAR RC for NEH, Barapani	-	-	-
ICAR RC for ER, Ranchi	-	-	
PAU, Ludhiana	5	13.10.2014	1
TNAU, Coimbatore	12	27.03.2014	5
GBPUA&T, Pantnagar	-		-
MPUA&T, CoA Pune	69	3.01.2015	23
NDUA&T, Faizabad	5		-
IGKVV, Raipur	13	-	13
MPUA&T, Udaipur	30	14.11.2014	13
KAU, CoA, Vellayani	17	-	-
CCSHAU, Hisar	-		
OUA&T, Bhubaneswar	21	27.12.2014	21
RAU, Samastipur, Pusa	4	-	-
CAU, CoH&F, Passighat	27	-	-
YSPUH & F, Nauni, Solan (HP).	-	-	-
HAIC, Murthal (Haryana)	-	-	-
Solan	236	-	173
Total	**372**		**249**

Solan Centre

Fungal forays were undertaken in the forest areas of Himachal Pradesh, Mizoram, Tripura and Meghalaya (Fig 5.1, 5.2 and 5.3). A total no of 236 specimens were collected and 210 specimens identified upto genus level. All the specimens have been preserved in the Herbarium of ICAR-DMR, Solan. All the specimens were examined for their macroscopic features in the field along with their field photographs.

Fig. 5.1. Mushroom sold in Trippura market

Fig. 5.2. Wild mushrooms of Tripura

Pure tissue cultures of 173 specimens were obtained and deposited in the Gene Bank of ICAR-DMR, Solan. All the specimens were identified on the basis of their morphological characters. The important specimen collected were *Agaricus, Mycena, Marasmius, Gymnopus, Xylaria, Ganoderma, Termitomyces, Phallus, Inocybe, Lactarius, Amanita, Auricularia, Pycnosporus, Russula, Coprinus, Leucocoprinus, Conocybe, Stropharia, Tremella, Crepidotus, Collybia* etc. *Schizophyllum commune* (edible mushroom) and *Pleurotus sp,* (edible mushroom) and *Lentinus* spp are sold in Tripura market@ Rs.300/kg.

Wild mushrooms from Meghalaya

Survey for collection of wild mushrooms from Meghalaya were undertaken on 17th and 18th Sept,2015 and a total number of thirty five collections were made which includes *Scleroderma, Amanita, Hebeloma, Lactarius, Boletus ,Boletellus, Gomphus, Laccaria, Gymnopilus Tricholoma* (7 spp), *Auricularia* and *Gomphidius*.

Fig. 5.3. Wild edible mushrooms from Meghalaya market

Bhubaneshwar Centre

Surveys were conducted in six districts under three agro-climatic situations of the state during Kharif, 2014. Twenty four indigenous mushrooms have been collected and identified based on available information. However, cultures of twenty one mushrooms have been deposited at the Directorate of Mushroom Research, Solan. They were *Boletus aestivalis, Calocybe indica, Chlorophyllum molybdetes, Ganoderma lucidum, Lentinus fusipes, Leucocoprinus sp, Lycoperdon pyriformi, Lentinus sp, Phellinus igniarius, Rhizopogon* sp., *Termitomyces heimi, Termitomyces eurrhizus, Tricholoma lobayense, Volvariella volvacea* and *Volvariella diplasia.* Two species *Termitomyces* were collected during the same period. The photographs from the natural habitats have been taken and mushrooms conserved (Table 5.2).

Table. 5.2. Wild mushroom germplasm collected at Bhubaneswar centre (2014-15)

Sl. No.	Scientific Name	Local Name	Habitat/ Substrate	Locality	Date of collection	edibility
I. Cultures deposited at Directorate of Mushroom Research, Solan						
1.	*Rhizopogon* sp.	-	Soil	Bhubaneswar, Khurda	30.06.2014	Not known
2.	*Ganoderma lucidum*	Reishi chhatu	Wooden stumps	Bhubaneswar, Khurda	05.07.2014	Medicinal
3.	*Chlorophyllum molybdetes*	-	Pastures	Bhubaneswar, Khurda	8.07.2014	Not known

Sl. No.	Scientific Name	Local Name	Habitat/ Substrate	Locality	Date of collection	edibility
4.	*Calocybe indica*	Dudha chhatu	Soil	Jujumura, Sambalpur	14.07.2014	Edible
5.	*Boletus aestivalis*	-	Soil	Balakati, Khurda	3.04.2014	Edible
6.	*Volvariella volvacea*	Pala chhatu	Decay straw heap, grass land	Bhawanipatna, Kalahandi	19.08.2014	Edible
7.	*Volvariella volvacea*	Pala chhatu	Decay straw heap, grass land	Bhawanipatna, Kalahandi	19.08.2014	Edible
8.	*Lentinus fusipes*	Banji chhatu	Wooden stumps	Kanikupa, Lanjigada, Kalahandi	19.8.2014	Edible
9.	*Termitomyces heimi*	Srabani chhatu	Deciduous grass land	Purunaguma, T. Rampur, Kalahandi	20.08.2014	Edible
10.	*Lentinus fusipes*	Banji chhatu	Wooden stumps	Jacum, Bhawanipatna, Kalahandi	20.8.2014	Edible
11.	*Lentinus sp*	Amba chhatu	Wooden log	Achyutpur, Soro, Balasore	1.10.2014	Edible
12.	*Leucocoprinus sp*	Amba chhatu	Pastures	Purunaguma, T.Rampur, Kalahandi	20.08.2014	Edible
13.	*Lycoperdon pyriformi*	-	Grassy area	OUAT, Bhubaneswar	14.10.2014	Edible
14.	*Phellinus tigniarius*	-	Wooden stumps or soil	OUAT, Bhubaneswar	2.11.2014	Edible
15.	*Volvariella diplasia*		Decay straw heap, grass land	Pipli, Puri	12.07.2014	Edible
16.	*Calocybe indica*	Dudha chhatu	Soil	Balakati, Khurda	30.10.2014	Edible
17.	*Termitomyces eurrhizus*	Nada chhatu	Termite infested soil	Balakati, Khurda	14.11.2014	Edible
18.	*Volvariella volvacea*	Pala chhatu	Decay straw heap, grass land	Balkati, Khurda	22.08.2014	Edible
19.	*Calocybe indica*	Dudha chhatu	Soil	Gada, Khaira, Balasore	22.08.2014	Edible
20.	*Tricholoma lobayense*	Khajuri chhatu	Soil	Purunaguma, T.Rampur, Kalahandi	20.08.2014	Edible
21.	*Volvariella volvacea*	Pala chhatu	Decay straw heap, grass land	Betnoti, Mayurbhanj	13.09.2014	Edible
II. Cultures have not been deposited						
1.	*Termitomyces* sp.	Nada chhatu	Pastures	OUAT, Bhubaneswar	09.07.2014	Edible
2.	*Termitomyces* sp.	Bali chhatu	Pastures	OUAT, Bhubaneswar	30.07.2014	Edible

Pune Centre

Survey for collection of wild edible mushroom for selection of promising strain if any from forests of Northern Maharashtra and Satpuda regions of Maharashtra were undertaken during monsoon during year 2014-15. The mycological characterization of collected samples was done as per the proforma provided by DMR, Solan. On the basis of mycological characters the wild samples were identified up to generic level by using reference book and internet information on website www.mushroomexpert.com and mushroom identification software *Mushroom Match-Maker.* During the survey, in all 69 samples were collected and 64 specimens are identified on the basis of mycological characters (Table 5.3). Among the identified samples some species belongs to genera *viz*. *Agaricus* sp*., Pleurotus* sp*., Tricholoma* sp., *Termitomyces* sp., *Polyporus* sp., *Boletus* sp. and *Clitocybe* sp. The tissue isolation of the collected samples was done and in all 23 pure cultures of mushroom were successfully derived, maintained and deposited in the Gene Bank of Directorate of Mushroom Research, Chambaghat, Solan for accession numbers and twenty (20) cultures obtained DMR accessions codes.

Raipur Centre

An intensive surveys of fleshy fungi were conducted in various locations of Chhattisgarh including forest area and local market. The mushrooms were collected from different habitat like forest rotten plant parts, decaying wood etc (Table 5.4). Site of collection and other information were obtained from seller, village chief and local men and women. Each collected samples were wrapped in paper and brought to the laboratory for identification. Identification of each sample was done very meticulously with the help of standard manuals and microscopic and macroscopic characters were recorded with due care. The collected samples were preserved in 4% formalin solution and dried sample have also been preserved.

The detailed microscopic and microscopic characters are discussed hereunder:

01. **R/2014/525 (DMRO-) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 20^{0}12.262' E81^{0}27.586' Altitude 1312ft. The basidiocarps were solitory and collected from rhizosphere area of teak tree. The colour of basidiocarps were white non hygrophonus, smell fungoid, scales were absent cap/pelius dia 7x6.8cm, stipe white, attached centrally, stipe length 8.3cm (L) X 4.61 cm (b), stipe base normal, lamellae smooth, adnate, gills were white to pink. Sample deposited in DMR repository.

02. **R/2014/526 (DMRO-) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 20^{0}13.412' E81^{02}2.738' Altitude 1240ft.The solitary basidiocarp collected beneath peapal tree it was non hygrophonus, fungoid, scale absent, spore print light pink cap dia 8.5-8.32cm, shape umbonate, stipe attached centrally stipe length 9.3cm and breadth 4.11cm, base normal,lamellae attachment free and gill colour white to pink gill edge smooth, edible. Sample deposited in DMR Repository.

03. **R/2014/527 (DMRO) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 20^{0}13.412' E81^{02}2.738' Altitude 1240ft.The solitary basidiocarp collected beneath peapal tree it was non hygrophonus, fungoid, scale absent, spore print light pink cap dia 7.9x7.32cm, shape umbonate, stipe attached centrally stipe length 8.61cm and breadth 4.12cm, base normal,lamellae attachment free and gill colur white to pink gill edge smooth, edible. Sample deposited in DMR Repository.

04. **R/2014/528 (DMRO) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 20^{0} 45.474' E81^{0} 36.332' Altitude 332m.The solitary basidiocarp collected beneath peapal tree it was non hygrophonus, fungoid, scale absent, spore print light pink cap dia 8.9-7.30cm, shape umbonate, stipe attached centrally stipe length 12.61cm and breadth 5.42cm, base normal,lamellae attachment free and gill colur white to pink gill edge smooth, edible. Sample deposited in DMR Repository.

Table 5.3. List of wild fleshy fungi collected during Monsoon 2014-2015 from Pune.

Sr. No.	Sample No.	Location	Isolate No.	DMR Accession Number	GPS data	Habitat	Cap Colour	Cap Dia (cm)	Cap Shape	Stipe attach-ment	Stipe length (cm)	Gill attach-ment	Identification
1	PN-14-001	Moshi, Pune	**	_	La-18^{0}40'18.23"N Lo-73^{0}50'55.82"E	Humus	White	13.1	Round	Central	7.2	Adnate	*Tricholoma* sp.
2	PN-14-002	A.C., Pune	PN-14-002	DMRA-152	La-18^{0}32'07.54"N Lo-73^{0}50'55.32"E	Humus	Gray	9.2	Round	Central	5.1	Free	*Tricholoma* sp.
3	PN-14-003	A.C., Pune	**	_	La-18^{0}32'09.02"N Lo-73^{0}50'51.82"E	Humus	Creamy yellow	14.8	Umbrella	Central	8.3	Free	*Termitomyces* sp.
4	PN-14-004	A.C., Pune	**	_	La-18^{0}32'10.62"N Lo-73^{0}50'45.40"E	Humus	Faint pink	7.2	Round	Central	4.3	Free	*Tricholoma* sp.
5	PN-14-005	A.C., Pune	**	_	La-18^{0}32'23.38"N Lo-73^{0}50'34.20"E	Coconut tree	Yellow	9.1	Flat	Central	5.6	Free	*Pluteus* sp.
6	PN-14-006	A.C., Pune	PN-14-006	_	La-18^{0}31'59.25"N Lo-73^{0}50'30.02"E	Wooden stump	Chocolate brown	37.4	Bracket	Lateral	-	-	*Ganoderma* sp.
7	PN-14-007	A.C., Pune	**	_	La-18^{0}32'01.86"N Lo-73^{0}50'39.73'E	Tree trunk	Yellowish white	15.4	Funnel	Lateral	2.3	Adnate	*Pleurotus* sp.
8	PN-14-008	-	**	-	-	-	-	-	-	-	-	-	-
9	PN-14-009	Pune Univ.	**	_	La-18^{0}33'09.45"N Lo-73^{0}49'37.13"E	Humus	Soil sand	12.2	Ovoid	Lateral	3.2	Adnate	*Pleurotus* sp.
10	PN-14-010	Bhimashankar	**	_	La-19^{0}04'12.75"N Lo-73^{0}32'14.54"E	Tree trunk	Brown	7.1	Bracket	Lateral	2.8	-	*Stereum* sp.
11	PN-14-011	Bhimashankar	**	_	La-19^{0}04'11.63"N Lo-73^{0}32'15.23"E	Tree trunk	White	5.3	Oyster	Lateral	2.2	-	*Stereum* sp.
12	PN-14-012	Bhimashankar	**	_	La-19^{0}04'11.47"N Lo-73^{0}32'15.38"E	Tree trunk	Blackish brown	17.6	Bracket	Lateral	-	-	*Ganoderma* sp.
13	PN-14-013	Bhimashankar	**	_	La-19^{0}04'11.66"N Lo-73^{0}32'16.32"E	Tree	Whitish creamy	3.5	Circular	Lateral	3.2	Decurrent	*Pleurotus* sp.
14	PN-14-014	Bhimashankar	**	_	La-19^{0}04'14.65"N Lo-73^{0}32'23.12"E	Wooden stump	White with rings	3.0	Funnel	Central	1.1	-	*Coltricia perennis*
15	PN-14-015	Bhimashankar	**	_	La-19^{0}04'12.47"N Lo-73^{0}32'13.38"E	Wooden stump	White	3.1	Oyster	Lateral	1.1	Adnasced	*Pleurotus* sp.
16	PN-14-016	A.C., Pune	**	_	La-18^{0}32'08.12"N Lo-73^{0}50'53.64"E	Coconut trunk	White	8.4	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
17	PN-14-017	A.C., Pune	**	_	La-18^{0}32'08.02"N Lo-73^{0}50'29.32"E	Sand	Brown	3.8	Circular	Central	2.8	Adnate	*Tricholoma* sp.
18	PN-14-018	A.C., Pune	**	_	La-18^{0}32'07.87"N Lo-73^{0}50'54.88"E	Tree trunk	Creamy	8.7	Oyster	Lateral	2.4	Adnasced	*Pleurotus* sp.

Sr. No.	Sample No.	Location	Isolate No.	DMR Accession Number	GPS data	Habitat	Cap Colour	Cap Dia (cm)	Cap Shape	Stipe attach-ment	Stipe length (cm)	Gill attach-ment	Identification
19	PN-14-019	A.C., Pune	PN-14-019	DMRP-309	La-18^{0}32'07.94"N Lo-73^{0}50'54.64"E	Tree trunk	Creamy white	8.9	Oyster	Lateral	2.1	Adnasced	*Pleurotus* sp.
20	PN-14-020	A.C., Pune	PN-14-020	DMRP-310	La-18^{0}32'07.94"N Lo-73^{0}50'54.28"E	Tree trunk	Pinkish white	10.6	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
21	PN-14-021	A.C., Pune	**	_	La-18^{0}32'09.12"N Lo-73^{0}50'31.08"E	Wooden stump	Brown	4.6	Button	Central	5.6	Adnasced	*Agaricus* sp.
22	PN-14-022	Vetal Hill, Pune	PN-14-022	DMRO-669	La-18^{0}31'33.95"N Lo-73^{048}'54.63 "E	Humus	Whitish	3.8	Circular	Central	6.1	Free	*Coprinus* sp
23	PN-14-023	Pune University	**	_	La-18^{0}33'04.14"N Lo-73^{0}49'34.69"E	Humus	White creamy	6.3	Circular	Central	2.9	Adbasced	*Tricholoma* sp.
24	PN-14-024	A.C., Pune	**	_	La-18^{0}32'08.09"N Lo-73^{0}50'29.04"E	Wooden stump	Faint pink	9.3	Oyster	Lateral	2.1	Free	*Pleurotus* sp.
25	PN-14-025	A.C., Pune	PN-14-025	DMRP-311	La-18^{0}32'08.03"N Lo-73^{0}50'30.08"E	Tree trunk	White	6.8	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
26	PN-14-026	Peth Awsari ghat, Pune	**	_	La-18^{0}55'40.13"N Lo-73^{0}55'16.01"E	Wood stump	White	3.3	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
27	PN-14-027	Peth Awsari ghat, Pune	PN-14-027	DMRO-670	La-18^{0}57'48.22"N Lo-73^{0}56'16.97"E	Wood stump	Creamy	10.4	Oyster like	Lateral	1.8	Adnasced	*Pleurotus* sp.
28	PN-14-028	Peth Awsari ghat, Pune	**	_	La-18^{0}57'07.28"N Lo-73^{0}56'28.30"E	Wood stump	Whitish	8.6	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
29	PN-14-029	Peth Awsari ghat, Pune	PN-14-029	DMRP-322	La-18^{0}58'03.36"N Lo-73^{0}56'26.30"E	Wood stump	Whitish	7.8	Oyster	Lateral	0.9	Adnasced	*Pleurotus* sp.
30	PN-14-030	Peth Awsari ghat, Pune	**	_	La-18^{0}57'42.40"N Lo-73^{0}56'11.04"E	Humus	Yellow	5.8	Round	Central	3.2	-	*Vascellum* sp.
31	PN-14-031	Peth Awsari ghat, Pune	**	_	La-18^{0}57'39.83"N Lo-73^{0}56'11.30"E	Humus	Creamy white	3.8	Convex	Central	4.6	-	*Ganoderma* sp.
32	PN-14-032	Peth Awsari ghat, Pune	**	_	La-18^{0}57'50.32"N Lo-73^{0}55'28.04"E	Humus	White	1.3	Strings	-	1.1	-	*Ramaria* sp.
33	PN-14-033	Peth Awsari ghat, Pune	**	_	La-18^{0}57'57.32"N Lo-73^{0}56'27.45"E	Humus	White	3.8	Oyster	Lateral	0.8	Adnasced	*Pleurotus* sp.
34	PN-14-034	Peth Awsari ghat, Pune	**	_	La-18^{0}58'73.20"N Lo-73^{0}57'10.02"E	Humus	Light brown	3.9	Umbrella	Central	4.2	Shortly decurrent	*Mycena* sp.
35	PN-14-035	Peth Awsari ghat, Pune	**	_	La-18^{0}57'55.59"N Lo-73^{0}56'21.10"E	Wooden stump	White	12.8	Oyster	Lateral	0.9	Adnasced	*Pleurotus* sp.
36	PN-14-036	Peth Awsari ghat, Pune	**	_	La-18^{0}58'12.30"N Lo-73^{0}57'10.03"E	Wooden stump	Brown with creamy rings	14.8	Bracket	Lateral	1.8	-	*Tramates* sp.

Sr. No.	Sample No.	Location	Isolate No.	DMR Accession Number	GPS data	Habitat	Cap Colour	Cap Dia (cm)	Cap Shape	Stipe attach-ment	Stipe length (cm)	Gill attach-ment	Identification
37	PN-14-037	Peth Awsari ghat, Pune	**	_	La-18^{0}58'10.22"N Lo-73^{0}56'31.50"E	Wooden stump	Light brown with rings	3.8	Disc type	Central	1.9	-	*Coltricia* sp.
38	PN-14-038	Peth Awsari ghat, Pune	PN-14-038	DMRP-312	La-18^{0}60'18.30"N Lo-73^{0}56'21.02"E	On tree trunk	Creamy white	2.9	Oyster	Lateral	0.7	Adnasced	*Pleurotus* sp.
39	PN-14-039	Peth Awsari ghat, Pune	**	_	La-18^{0}59'26.82"N Lo-73^{0}56'52.57"E	Humus	Yellowish	4.9	Strings	-	1.5	-	*Ramaria* sp.
40	PN-14-040	Peth Awsari ghat, Pune	PN-14-040	DMRP-313	La-18^{0}59'21.02"N Lo-73^{0}57'48.60"E	Wooden stump	Pinkish	9.2	Oyster	Lateral	0.6	Adnasced	*Pleurotus* sp.
41	PN-14-041	Igatpuri, Nashik	PN-14-041	DMRP-314	La-19^{0}47'27.19"N Lo-73^{0}33'30.1"E	Trunk tree	Pink	5.8	Oyster	Lateral	1.2	Adnasced	*Pleurotus eous*
42	PN-14-042	Igatpuri, Nashik	PN-14-042	DMRP-315	La-19^{0}41'20.18"N Lo-73^{0}30'21.30"E	Tree trunk	White	5.8	Oyster	Lateral	0.9	Adnate	*Pleurotus* sp.
43	PN-14-043	Igatpuri, Nashik	PN-14-043	DMRP-316	La-19^{0}41'34.67"N Lo-73^{0}33'28.43"E	Wooden stump	White	7.6	Oyster	Lateral	1.1	Shortly decurrent	*Pleurotus* sp.
44	PN-14-044	Igatpuri, Nashik	PN-14-044	DMRP-318	La-19^{0}41'69.04"N Lo-73^{0}31'70.20"E	Tree trunk	White	5.2	Oyster	Lateral	0.6	Shortly decurrent	*Pleurotus* sp.
45	PN-14-045	Ghoti-Nashik highway	PN-14-045	DMRP-319	La-19^{0}41'49.84"N Lo-73^{0}31'46.00"E	Wooden stump	Creamy White	4.7	Round	Central	4.8	Decur-rent	*Hygrophorus* sp.
46	PN-14-046	Igarpuri-Trimbakeshwar	PN-14-046	DMRP-320	La-19^{0}41'38.40"N Lo-73^{0}31'18.10"E	Tree trunk	Creamy White	14.3	Oyster	Lateral	1.2	Shortly decurrent	*Pleurotus* sp.
47	PN-14-047	Vaitarna, Nashik	PN-14-047	DMRP-317	La-19^{0}40'45.69"N Lo-73^{0}32'38.42"E	Tree trunk	Creamy White	9.8	Oyster	Lateral	0.9	Shortly decurrent	*Pleurotus* sp.
48	PN-14-048	Vaitarna, Nashik	PN-14-048	DMRP-321	La-19^{0}40'48.30"N Lo-73^{0}32'24.76"E	Tree trunk	Faint pink	14.9	Oyster	Lateral	1.1	Shortly decurrent	*Pleurotus* sp.
49	PN-14-049	Vaitarna, Nashik	PN-14-049	_	La-19^{0}40'45.96"N Lo-73^{0}32'32.63"E	Tree trunk	White	8.9	Oyster	Lateral	0.9	Shortly decurrent	*Pleurotus* sp.
50	PN-14-050	Kanashi, Nashik	PN-14-050	DMRP-323	La-20^{0}31'27.67"N Lo-73^{0}54'41.63"E	Mango tree trunk	Dark pink	6.9	Oyster	Lateral	1.1	Shortly decurrent	*Pleurotus eous*
51	PN-14-051	Kanashi, Nashik	**	_	La-20^{0}31'23.70"N Lo-73^{0}54'50.51"E	Tree trunk	Grey	8.7	Bracket	Lateral	1.8	Decurrent	*Daedalea* sp.
52	PN-14-052	Trimbakeshwar Nashik	**	_	La-19^{0}55'20.32"N Lo-73^{0}31'13.34"E	Humus	Grayish	9.8	Flat	Central	8.1	Free	*Agaricus* sp.
53	PN-14-053	Trimbakeshwar Nashik	PN-14-053	DMRO-671	La-19^{0}55'12.09"N Lo-73^{0}31'22.11"E	Soil	Creamy yellow	5.2	Umbrella	Central	3.1	Shortly decurrent	*Mycena haematopus*
54	PN-14-054	Trimbakeshwar Nashik	**	_	La-19^{0}55'06.46"N Lo-73^{0}31'50.63"E	Soil	Yellow	4.2	Bell shape	Central	3.8	Adnesced	*Amanita muscaria*

Sr. No.	Sample No.	Location	Isolate No.	DMR Accession Number	GPS data	Habitat	Cap Colour	Cap Dia (cm)	Cap Shape	Stipe attach-ment	Stipe length (cm)	Gill attach-ment	Identification
55	PN-14-055	Trimbakeshwar Nashik	**	_	La-19^{0}55'04.46"N Lo-73^{0}32'23.11"E	Humus	Slightly yellow	4.6	Flat	Central	6.9	-	*Polyporus arcularia*
56	PN-14-056	Trimbakeshwar Nashik	**	_	La-19^{0}55'02.74"N Lo-73^{0}29'00.75"E	Sandy soil	Brownish	6.9	Flat circular	Central	4.9	Adnasced	*Agaricus* sp.
57	PN-14-057	Trimbakeshwar Nashik	PN-14-057	DMRO-672	La-19^{0}54'38.55"N Lo-73^{0}29'12.26"E	Humus	Creamy White	3.9	Convex	Central	10.8	Adnate	*Agrocybe aerenita*
58	PN-14-058	Trimbakeshwar Nashik	**	_	La-19^{0}54'34.88"N Lo-73^{0}29'04.75"E	Wooden stump	Yellow	8.4	Fan shaped	Lateral	0.8	-	*
59	PN-14-059	Trimbakeshwar Nashik	**	_	La-19^{0}54'01.78"N Lo-73^{0}30'58.50"E	Leaf litter	Whitish	4.9	Circular	Central	8.9	-	*
60	PN-14-060	Trimbakeshwar Nashik	**	_	La-19^{0}56'02.91"N Lo-73^{0}30'33.12"E	Humus	Whitish Gray	3.8	Circular	Central	12.9	Free	*Cortinarius* sp.
61	PN-14-061	A.C., Pune	**	_	La-18^{0}32'07.12"N Lo-73^{0}50'48.70"E	Tree trunk	Dark pink	9.4	Oyster	Lateral	0.9	Short decurrent	*Pleurotus eous*
62	PN-14-062	Nashik	PN-14-062	_	La-20^{0}02'54.18"N Lo-74^{0}01'26.63"E	Humus	Brown	6.8	Flat circular	Central	10.3	Adnate	*Agaricus* sp.
63	PN-14-063	Nashik	**	_	La-20^{0}02'37.75"N Lo-74^{0}01'34.93"E	Humus Sand	Dark red	3.8	Circular	Central	6.3	Adnexed	*Laccaria* sp.
64	PN-14-064	Pune University	**	_	La-18^{0}33'17.17"N Lo-73^{0}49'17.51"E	Humus	Gray	4.8	Umbrella	Central	9.3	Free	*Tricholoma* sp.
65	PN-14-065	Pune University	**	_	La-18^{0}33'14.36"N Lo-73^{0}39'17.00"E	Wooden stump	White	5.9	Oyster	Lateral	0.4	Decurrent	*Pleurotus* sp.
66	PN-14-066	Mahabaleshwar	**	_	La-17^{0}55'08.23"N Lo-73^{0}38'04.79"E	Termitoria	Grayish white	2.8	Umbrella	Central	6.9	Free	*Termitomyces* sp.
67	PN-14-067	Mahabaleshwar	**	_	La-17^{0}56'12.40"N Lo-73^{0}38'04.05"E	Humus	Dark red	9.3	Honey comb	Central	1.1	-	*Clathrus ruber*
68	PN-14-068	Mahabaleshwar	**	_	La-17^{0}56'06.07"N Lo-73^{0}38'04.79"E	Termitoria	White	2.9	Umbrella	Central	4.9	Free	*Termitomyces* sp.
69	PN-14-069	Niphad, Nashik	**	_	La-20^{0}06'13.14"N Lo-74^{0}03'34.76"E	Humus	White	6.3	Umbrella	Central	6.2	Adnexed	*Tricholoma* sp.
70	PN-14-070	Kokangaon, Nashik	**	_	La-20^{0}08'14.15"N Lo-74^{0}57'51.20"E	Humus	Light brown	8.2	Umbrella	Central	7.3	Adnexed	*Tricholoma* sp.

**** Pure culture not obtained *unidentified**
Total no. of wild fleshy fungi collected = 69
No. of wild fleshy fungi cultures sent to DMR, Solan = 23
No. of wild fleshy fungi cultures obtained DMR Accession codes = 20

Table 5.4. Wild edible mushroom collection, identification and conservation.

Sl. No.	Accession No	Name of fungi	Habitat/ Substrates	Place	Month of collection	Edibility
1	R/2014/525	*Calocybe indica** Milky mushroom	Beneath teak tree	Mardapoti, kanker	22Aug, 2014	edible
2	R/2014/526	*Calocybe indica* * Milky mushroom	Beneath peapal tree	Ichhapur, Kanker	22.Aug, 2014	edible
3	R/2014/527	*Calocybe indica** Milky mushroom	Beneath peapal tree	Ichhapur, Kanker	22.Aug, 2014	edible
4	R/2014/528	*Calocybe indica** Milky mushroom	On trunk of pepal tree	Darobha, Abhanpur	8 Sept. 2014	edible
5	R/2014/529	*Calocybe indica** Milky mushroom	On trunk of pepal tree	Sankara, Dhamtari	10.08. 2014	edible
6	R/2014/530	*Calocybe indica** Milky mushroom	On the base of Pepal tree	Dharampura, Raipur	08.Sept. 2014	edible
7	R/2014/531	*Calocybe indica** Milky mushroom	On trunk of baniyan tree	Science college Raipur	8.Aug, 2014	edible
8	R/2014/534	*Calocybe indica** Milky mushroom	On trunk of peapal tree	Science college Raipur	8.Aug, 2014	edible
9	R/2014/502	*Volvariella volvacea**	On heap of rotten paddy straw	Patan	Aug 2014	edible
10	R/2014/101	*Volvariella volvacea**	Rotten heap of paddy straw	Behind Mush Lab	July 2014	edible
11	R/2014/100	*Bovista* spp	On leaf litter of tree	Infront of Mush Lab.	July 2014	edible
12	R/2014/102	*Bovista* spp	On leaf litter of tree	In front of Mush Lab	July 2014	edible
13	R/2014/103	*Agrocybe* spp	On rotten trunk of sarai tree	Dharampura	July 2014	edible
15	Pl-61	*Pleurotus florida*	Very old culture	Supplied by NRCM solan	2006	edible
16	Psc-51	*Pleurotus sajor caju*	Very old culture	Supplied by NRCM solan	2006	edible

* Culture deposited in DMR, Solan

05. R/2014/529 (DMRO) (*Calocybe indica*) milky mushroom: The GPS location was recorded as N 20^0 46.473' E 81^0 35.331' Altitude 333m.The solitary basidiocarp collected beneath peapal tree it was non hygrophonus, fungoid, scale absent, spore print light pink cap dia 9.5-10.32cm, shape umbonate, stipe attached centrally stipe length 3.50 cm and breadth 4.20 cm, base normal,lamellae attachment free and gill colur white to pink gill edge smooth, edible. Sample deposited in DMR Repository.

06. R/2014/530 (DMRO) (Tricholoma spp or *Calocybe indica*) milky mushroom: The GPS location was recorded as N 21^0 15.714' E 81^0 34.765' Altitude 1094ft.The solitary basidiocarp collected from trunk of banyan tree it was white in colour, non hygrophonus, fungoid, scale absent, spore print light pink cap dia 8.9cm x 7.0 cm, shape umbonate, stipe attached centrally stipe length 12.10cm and breadth 5.60cm, base bulbus ,lamellae attachment free and gill colur white to pink gill edge smooth, : edible. Sample deposited in DMR Repository.

07. **R/2014/531 (DMRO) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 21^0 16.717' E 81^0 34.660' Altitude 1096ft.The solitary basidiocarp collected beneath of banyan tree it was white in colour, non hygrophonus, fungoid, scale absent, spore print light pink cap dia 10.5cm x 11.5 cm, shape umbonate, stipe attached centrally stipe length 03cm and breadth 07cm, base bulbus ,lamellae attachment free and gill colur white to pink gill edge smooth, : edible. Sample deposited in DMR Repository.

08. **R/2014/534 (DMRO) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 21^0 16.717' E 81^0 34.660' Altitude 1096ft.The basidiocarps were in groups, collected from trunk of peapal tree it was white in colour, non hygrophonus, fungoid, scale absent, spore print light pink cap dia 9.80cm x 10.5 cm, shape umbonate, stipe attached centrally stipe length 4.50cm and breadth 06cm, base normal ,lamellae attachment free and gill colur white to pink gill edge smooth, : edible. Sample deposited in DMR Repository.

09. **R/2014/541 (DMRO) (*Calocybe indica*) milky mushroom**: The GPS location was recorded as N 21^0 14.100' E 81^0 41.710' Altitude 1061ft.The solitary basidiocarp collected from beneath peapal tree it was white in colour, non hygrophonus, fungoid, scale absent, spore print light pink cap dia 11.00cm x 8.20 cm, shape umbonate, stipe attached centrally stipe length 9.30cm and breadth 4.11 cm, base normal ,lamellae attachment free and gill colur white to pink gill edge smooth, : edible. Sample deposited in DMR Repository.

10. **R/2014/502 (DMRO) (*Volvariella volvacea*) Paddy straw mushroom:** The colour of sporophore was grey/ brown, solitary, pileus open spore prints were rusty brown. pelius dia 7.70 x 7.2cm, shape convex umbonate stipe white, attached centrally, stipe length 8.10cm (L) X 1.25 cm (b) and volva present, lamellae smooth, adnate, sample deposited in DMR repository

11. **R/2014/101 (DMRO) (*Volvariella volvacea*) Paddy straw mushroom:** The GPS location was recorded as N 12^0 12.845' E 80^0 41.573' Altitude 1123ft.The colour of sporophore was grey/ brown, solitary, pileus open spore prints were rusty brown. pelius dia 9.50 x 9.35cm, shape convex umbonate stipe white, attached centrally, stipe length 12.5cm (L) X 1.55 cm (b) and volva present, lamellae smooth, adnate, sample deposited in DMR repository.

12. **R/2014/100 (*Bovista plumbea*)**: The GPS location was recorded as N 12^0 12.845' E 80^0 41.573' Altitude 1123ft.The colour of sporophore was white, solitary and in groups, sporophores are cleistothallus. pelius dia 2.9cm x 2.47cm, shape globular, sessile,non hygrophonus, smooth. sample deposited in DMR repository.

13. **R/2014/102 (*Bovista plumbea*)**: The GPS location was recorded as N 12^0 12.845' E 80^0 41.573' Altitude 1123ft. Collected on 23.07.2014. The colour of sporophore was white, solitary and in groups, sporophores are cleistothallus. pileus dia 3.7cm x 3.15cm, shape globular, sessile,non hygrophonus, smooth. sample deposited in DMR repository.

14. **R/2014/103 (*Agrocybe* spp)**: The GPS location was recorded as N 21^0 15.716' E 81^0 34.761' Altitude 1101ft. Collected on 23.07.2014. The colour of sporophore was white, in groups, sporophores are depressed. pileus dia 3.51cm x 3.92cm, non hygrophonus, stipe attached centrally, length 5.62cm and breadth 0.66cm stipe base normal gills attached strongly decurrent, colour white to pink gills edge smooth, : edible. sample deposited in DMR repository.

15. **R/2014/61 (*Pleurotus florida*) strain PL-61 Oyster Mushroom**: The colour of sporophore white, caespitose, cap 8.20cm X 8.1 cm,briefly convex and funnel shaped. Gills whitish, crowded, very decurrent on stipe. Stipe2.9-4.2 X 1.5-3.1cm excentric rarely central, flesh white , thick . fairly pleasant odour , flavor fungoid spore print white to light pink in colour. : very good in fresh

16. **R/2014/51 (*Pleurotus sajor caju*) strain Psc-51 Oyster Mushroom**: the colour of sporophore gray, solitary, cap 6.5-10cm X 6.3-10 cm,. Gills whitish, crowded, very decurrent on stipe. Stipe2.1-4.2 X 1.2-3.0cm excentric rarely central, flesh white, thick. Fairly pleasant odour , flavor fungoid spore print white to light pink in colour. : very good in fresh. Rainfall and temperature data coincide with the appearance/arrival of wild edible mushrooms in local markets.

Udaipur Centre

Table 5.5. Mushroom samples colleceted from market at Udaipur

Name of the market/district	Date of collection	Sale price (Rs/kg)	Mode of consumption	Soil type	Temp range	Rainfall/ Temp
Sh. Madho Ji, Badi Mandi, Rajsamand.	06-08-14	Rs.130/	cooked as vegetable	Sand	35-38°C	35°C
Sh. Jataram ji, Sabji Mandi. Devpura, Rajsamand	06-08-14	Rs.130/	cooked as vegetable	-	35-38°C	35°C
Sh. Asaram ji, Sabji Mandi Devpura, Rajsamand	06-08-14	Rs.130/	cooked as vegetable	-	35-38°C	35°C

Table 5.6. Culture's (7) Deposited to DMR Solan and got accession numbers

1	*Hohenbeuinia*	DMRO-643	Dr Anila Doshi, AICRP,Udaipur, UD-06-14	23-12-14
2	*Auricularia sp*	DMRO-644	Dr Anila Doshi, AICRP,Udaipur, UD-11-14	23-12-14
3	*Bolbitius sp*	DMRO-645	Dr Anila Doshi, AICRP,Udaipur, UD-12-14	23-12-14
4	*Schizophyllum sp*	DMRO-646	Dr Anila Doshi, AICRP,Udaipur, UD-37-14	23-12-14
5	unknown	DMRO-647	Dr Anila Doshi, AICRP,Udaipur, UD-45-14	23-12-14
6	unknown	DMRO-648	Dr Anila Doshi, AICRP,Udaipur, UD-95-14	23-12-14
7	*Agaricus* sp.	DMRA-151	Dr Anila Doshi, AICRP,Udaipur, UD-60-14	23-12-14

Table 5.7. Specimens (30) Deposited to DMR Solan

S.No	Specimens No.	Name of Mushroom	S. No.	Specimens No.	Name of Mushroom
1	UD-01/14	*Podaxix pistrillarias*	16	UD-57/14	*Wood rotting fungi*
2	UD-05/14	*Lateiporus*	17	UD-62/14	*Polypore*
3	UD-07/14	*Lepiota*	18	UD-63/14	*Auricularia auriculae judae*
4	UD-09/14	*Polypore*	19	UD-64/14	*Ganoderma lucidum*
5	UD-13/14	*Hericium*	20	UD-65/14	*Ganoderma lucidum*
6	UD-18/14	*Lepiota morganii*	21	UD-71/14	*Tricholoma flaviovi rens*
7	UD-23/14	*Pleurotus pulmonarius*	22	UD-72/14	*Colotricha*
8	UD-29/14	*Termitomyces*	23	UD-76/14	*Unidentified*
9	UD-34/14	*Puff ball*	24	UD-77/14	*Polypores*
10	UD-37/14	*Schizophyllum*	25	UD-78/14	*Unidentified*
11	UD-38/14	*Phellorina herculena*	26	UD-82/14	*Polypore morri*
12	UD-39/14	*Leucopaxillus*	27	UD-84/14	*Cordeyceps / xylaria*
13	UD-41/14	*Polypore sulphureus*	28	UD-93/14	*Lentinula*
14	UD-49/14	*Mycenia*	29	UD-94/14	*Marasmus*
15	UD-53/14	*Wood rotting fungi*	30	UD-98/14	*Unidentified*

Table 5.8. Collection, Identification and Conservation of Wild Edible Mushrooms

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
Ud-01/14	*Podaxis pistillaris*	05-05-2014	RCA, Udaipur	On Soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-02/14	*Agaricus*	23-05-2014	Devli	On Soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-03/14	*Termitomyces microcarpus*	18-07-2014	RCA, Udaipur	On Termite Soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-04/14	*Lepiota procera*	31-07-2014	RCA, Udaipur	On soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-05/14	*Leteiporus*	31-07-2014	RCA, Udaipur	On soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-06/14	*Pleurotus* spp.	31-07-2014	RCA, Udaipur	On Soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m
Ud-07/14	*Lepiota*	01-08-2014	Badi	On Soil	N-24^{0}53.476' E-073^{0}33.587' Elevation-687m
Ud-08/14	*Leucocoprinus brebissoni*	01-08-2014	Near nahar colour	On adusa dead wood	N-24^{0}39.649' E-073^{0}38.349' Elevation- 654 m
Ud-09/14	*Polypore*	01-08-2014	Naya guda	On dead wood	N-24^{0}43.135' E-073^{0}36.368' Elevation- 700 m
Ud-10/14	*Volvariella*	01-08-2014	Naya Guda	Dead wood	N-24^{0}43.135' E-073^{0}36.368' Elevation- 700 m
Ud-11/14	*Auricularia spp.*	01-08-2014	Naya Guda	On dead wood khakra	N-24^{0}43.135' E-073^{0}36.368' Elevation- 700 m
Ud-12/14	unidentified	01-08-2014	Naya Guda	On dead wood	N-24^{0}43.135' E-073^{0}36.368' Elevation- 700 m
Ud-13/14	*Hericium*	01-08-2014	Naya Guda	On dead wood	N-24^{0}45.792' E-073^{0}37.601' Elevation- 761 m
Ud-14/14	*Auricularia*	01-08-2014	Naya Guda	On dead wood	N-24^{0}45.792' E-073^{0}37.601' Elevation- 761 m
Ud-15/14	*Sulphur tuft*	01-08-2014	Naya Guda	On soil	N-24^{0}45.792' E-073^{0}37.601' Elevation- 761 m
Ud-16/14	unidentified	01-08-2014	Naya guda	On Soil	N-24^{0}45.792' E-073^{0}37.601' Elevation- 761 m
Ud-17/14	unidentified	01-08-2014	Naya guda	On soil	N-24^{0}45.792' E-073^{0}37.601' Elevation- 761 m
Ud-18/14	*Lepiota morganii*	01-08-2014	Kadla Losin	Leaf Litter	N-24^{0}54.084' E-073^{0}32.452' Elevation- 724 m
Ud-19/14	*Lepiota*	01-08-2014	Riched	On soil	N-24^{0}56.110' E-073^{0}32.617' Elevation- 738 m
Ud-20/14	*Ascomycotina*	01-08-2014	Majera	On soil	N-24^{0}56.110' E-073^{0}32.617' Elevation- 738 m
Ud-21/14	unidentified	01-08-2014	Majera	On dead wood	N-24^{0}56.110' E-073^{0}32.617' Elevation- 738 m

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
Ud-22/14	*Lepiota* spp.	01-08-2014	Majera	On soil	N-24^{0}56.110' E-073^{0}32.617' Elevation- 738 m
Ud-23/14	*Pleurotus pulmonarius*	01-08-2014	kelwara	On dead Jatropha	N-25^{0}07.170' E-073^{0}36.641' Elevation- 863 m
Ud-24/14	unidentified	01-08-2014	Kelwara	On dead wood of Pipal	N-25^{0}10.691' E-073^{0}41.422' Elevation- 819 m
Ud-25/14	*Clitocybe*	01-08-2014	kelwara	On Soil	N-25^{0}10.691' E-073^{0}41.422' Elevation- 819 m
Ud-26/14	unidentified	01-08-2014	Sadri road	On tamarind root	N-25^{0}15.329' E-073^{0}37.292' Elevation- 539 m
Ud-27/14	*Coprinus comatus*	01-08-2014	Desuri road	On soil	N-25^{0}15.120' E-073^{0}32.631' Elevation- 408 m
Ud-28/14	*Agaricus* spp	01-08-2014	Sadri Road	On Soil	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-29/14	*Termitomyces*	01-08-2014	Sadri road	on soil	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-30/14	*Pisolithus tinctorius*	01-08-2014	Sadri road	on eucalyptus plant	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-31/14	unidentified	01-08-2014	Sadri road	On soil	N-25^{0}09.876' E-073^{0}27.172' Elevation- 379 m
Ud-32/14	*Volvariella volvaceae*	01-08-2014	Sadri road	Humus	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-33/14	*Puff ball*	01-08-2014	Sadri road	on soil	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-34/14	*Tricholoma flavorriens*	01-08-2014	Sadri road	On root of euclayptus	N-25^{0}09.876' E-073^{0}27.132' Elevation-379 m
Ud-35/14	*Agaricus xanthodermus*	1-08-2014	Sadri road	On soil	N-25^{0}03.268' E-073^{0}26.109' Elevation-741 m
Ud-36/14	*Ramaria* spp.	01-08-2014	Sadri road	On soil	N-25^{0}03.268' E-073^{0}26.109' Elevation-741 m
Ud-37/14	*Schizophyllum*	06-08-2014	Ravali-tatgarh	On dead wood	N-25^{0}34.067' E-073^{0}48.259' Elevation-511 m
Ud-38/14	*Phellorinia herculena*	06-08-2014	Guda Bhopat	On soil	N-25^{0}31.523' E-073^{0}46.720' Elevation-410 m
Ud-39/14	*Leucopaxillas or Macrocybe*	11-08-2014	Ambamata, Udaipur	On root of barged tree	N-24^{0}33.995' E-073^{0}42.538' Elevation-653 m
Ud-40/14	*Fomes* spp	11-08-2014	RCA, Udaipur	On dead wood	N-24^{0}33.995' E-073^{0}42.538' Elevation-653 m
Ud-41/14	*Polypore sulphureus*	11-08-2014	RCA, Udaipur	On dead wood	N-24^{0}33.995' E-073^{0}42.538' Elevation-653 m
Ud-42/14	*Fomes* spp.	11-08-2014	RCA, Udaipur	On Soil	N-24^{0}33.995' E-073^{0}42.538' Elevation-653 m

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
Ud-43/14	*Polypore sulphureus*	11-08-2014	RCA, Udaipur	On root	N-24^{0}33.995' E-073^{0}42.538' Elevation-653 m
Ud-44/14	*Volvariella* spp.	12-08-2014	Devala Choraha	On Soil	N-25^{0}28.617' E-073^{0}50.759' Elevation-641 m
Ud-45/14	*Pleurotus* spp.	12-08-2014	Devela choraha	On Ratanjot	N-25^{0}28.617' E-073^{0}50.759' Elevation-641 m
Ud-46/14	*Boletus porosporus*	12-08-2014	Abu road	On Soil	N-24^{0}33.404' E-072^{0}47.580' Elevation-395 m
Ud-47/14	*Lenzites*	12-08-2014	Abu road	On soil	N-24^{0}33.404' E-072^{0}47.580' Elevation-395 m
Ud-48/14	*Entoloma* spp.	12-08-2014	Abu road	Single or in group	N-24^{0}34.143' E-072^{0}47.068' Elevation-595 m
Ud-49/14	*Mycenia*	12-08-2014	Abu road	On Soil	N-24^{0}34.157' E-072^{0}45.853' Elevation-892 m
Ud-50/14	*Macrocybe*	12-08-2014	Mount abu	Collar region of gular plant	N-24^{0}35.223' E-072^{0}42.927' Elevation-1119 m
Ud-51/14	*Psathyrella* spp.	12-08-2014	Mount abu	On date palm	N-24^{0}35.734' E-072^{0}42.065' Elevation-1132 m
Ud-52/14	*Clitocybe* spp.	12-08-2014	Mount abu	On mango collar region	N-24^{0}35.734' E-072^{0}42.065' Elevation-1132 m
Ud-53/14	*Wood rotting fungi*	12-08-2014	Mount abu	On mango tree	N-24^{0}35.734' E-072^{0}42.065' Elevation-1132 m
Ud-54/14	*Jelly mushroom*	12-08-2014	Mount abu	On dead wood	N-24^{0}35.671' E-072^{0}42.039' Elevation-1165 m
Ud-55/14	unidentified	12-08-2014	Mount abu	On root	N-24^{0}35.671' E-072^{0}42.039' Elevation-1165 m
Ud-56/14	unidentified	12-08-2014	Mount abu	On root, on leaf litter	N-24^{0}35.671' E-072^{0}42.039' Elevation-1165 m
Ud-57/14	Wood rotting fungi	12-08-2014	Mount abu	On living plant	N-24^{0}35.671' E-072^{0}42.039' Elevation-1165 m
Ud-58/14	*Clitocybe* spp.	12-08-2014	Badi road	On soil /leaf litter	N-24^{0}35.928' E-072^{0}41.892' Elevation-671 m
Ud-59/14	*lepiota* spp.	12-08-2014	Badi road	On soil	N-24^{0}35.928' E-072^{0}41.892' Elevation-671 m
Ud-60/14	*Agaricus*	20-08-2014	khroda	On soil	N-24^{0}37.283' E-073^{0}39.774' Elevation-516 m
Ud-61/14	*Pyonoporus*	20-08-2014	Bhinder	On karanj plant	N-24^{0}37.283' E-073^{0}39.774' Elevation-516 m
Ud-62/14	*Polypore*	20-08-2014	Lunda	On dead wood	N-24^{0}29.685' E-074^{0}11.843' Elevation-488 m
Ud-63/14	*Auricularia auriculae judae*	20-08-2014	Lunda	On dead wood	N-24^{0}29.685' E-074^{0}11.843' Elevation-488 m

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
Ud-64/14	*Ganoderma lucidum*	20-08-2014	Lunda	On dead wood	N-24^{0}29.685' E-074^{0}11.843' Elevation-488 m
Ud-65/14	*Ganoderma spp. lucidum*	20-08-2014	Bansi	On dead wood (shisham)	N-24^{0}19.616' E-074^{0}23.307' Elevation-514 m
Ud-66/14	*Pleurotus salmoneo straminus*	20-08-2014	Bansi forest	On jatropha	N-24^{0}18.463' E-074^{0}28.845' Elevation-521 m
Ud-67/14	*Thalephora*	20-08-2014	Bansi	On living tree of Shisham	N-24^{0}18.463' E-074^{0}28.845' Elevation-521 m
Ud-68/14	unidentified	20-08-2014	Sita Mata Forest	On Soil	N-24^{0}16.948' E-074^{0}24.635' Elevation-516 m
Ud-69/14	*Lepista or Clitocybe*	20-08-2014	Sitamata forest	On Soil	N-24^{0}16.948' E-074^{0}24.635' Elevation-516 m
Ud-70/14	*Geaster*	20-08-2014	Sitamata forest	On Soil	N-24^{0}16.948' E-074^{0}24.635' Elevation-516 m
Ud-71/14	*Tricholoma flaviouriens*	20-08-2014	Sitamata forest	On root	N-24^{0}16.948' E-074^{0}24.635' Elevation-516 m
Ud-72/14	*Coltricia*	20-08-2014	Sitamata forest	On dead wood	N-24^{0}16.948' E-074^{0}24.635' Elevation-516 m
Ud-73/14	*Termitomyces*	20-08-2014	Sita Mata forest	On Soil	N-24^{0}13.374' E-074^{0}25.845' Elevation-389 m
Ud-74/14	*Geaster*	26-08-2014	Bassi forest	On Soil/ leaf litter	N-24^{0}13.375' E-074^{0}25.944' Elevation-503 m
Ud-75/14	*Ganoderma luciduim*	26-08-2014	Bassi forest	On root of the living tree	N-24^{0}13.375' E-074^{0}25.944' Elevation-503 m
Ud-76/13	*unidentified*	26-08-2014	Bassi forest	On Soil	N-24^{0}13.375' E-074^{0}25.944' Elevation-503 m
Ud-77/14	*Polyporus*	26-08-2014	Bassi forest	On dead wood	N-24^{0}13.375' E-074^{0}25.944' Elevation-503 m
Ud-78/14	unidentified	26-08-2014	Bassi Forest	On dead wood	N-25^{0}00.975' E-074^{0}48.749' Elevation-506 m
Ud-79/14	*Tricholoma flaviovrriens*	26-08-2014	Bassi Forest	On root of plant kachnar	N-25^{0}00.975' E-074^{0}48.749' Elevation-506 m
Ud-80/14	*Paneolus*	26-08-2014	Bassi forest	On cow dung	N-24^{0}59.514' E-074^{0}48.789' Elevation-436 m
Ud-81/14	*Polyporus*	26-08-2014	Bassi forest	On dead wood	N-24^{0}59.514' E-074^{0}48.789' Elevation-436 m
Ud-82/14	*Polyporus morri*	26-08-2014	Bassi forest	On dead wood	N-24^{0}59.514' E-074^{0}48.789' Elevation-436 m
Ud-83/14	*Agaricus* spp.	26-08-2014	Chittorgarh	On soil	N-25^{0}00.231' E-074^{0}49.140' Elevation-577 m
Ud-84/14	*Cordeyceps* / *Xylaria*	28-08-2014	Ubashwar road	On termite nest	N-24^{0}52.840' E-074^{0}38.915' Elevation-705 m

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
Ud-85/14	unidentified	28-08-2014	Ubashwar road	On soil	N-24^{0}52.840' E-074^{0}38.915' Elevation-705 m
Ud-86/14	*Lepiota* spp.	28-08-2014	Ubashwar road	On soil	N-24^{0}52.840' E-074^{0}38.915' Elevation-705 m
Ud-87/14	*Volvariella miniata*	28-08-2014	Ubashwar road	On soil	N-24^{0}52.840' E-074^{0}38.915' Elevation-705 m
Ud-88/14	unidentified	28-08-2014	Ubashwar road	On bamboo	N-24^{0}52.840' E-074^{0}38.915' Elevation-705 m
Ud-89/14	*Thalephorus*	28-08-2014	Near Falasia	On sisham living plant	N-24^{0}37.299' E-073^{0}33.963' Elevation-561 m
Ud-90/14	*Polyporus*	28-08-2014	Falasia road	On dead wood	N-24^{0}37.299' E-073^{0}33.963' Elevation-561 m
Ud-91/14	*Polyporus alveolaris*	28-08-2014	Karel	On dead wood	N-24^{0}12.742' E-073^{0}21.097' Elevation-609 m
Ud-92/14	*Volvariella* spp.	28-08-2014	Near som	On soil	N-24^{0}12.765' E-073^{0}21.125' Elevation-572 m
Ud-93/14	*Lentinula*	28-08-2014	Kharwara to som road	On dead wood	N-24^{0}11.987' E-073^{0}20.757' Elevation-410 m
Ud-94/14	*Marasmius*	02-09-2014	Gadi	On soil	N-23^{0}59.330' E-073^{0}32.668' Elevation-268 m
Ud-95/14	*Pleurotus*	02-09-2014	Bagidora Road	On mahua plant dead	N-23^{0}37.033' E-074^{0}08.969' Elevation-274 m
Ud-96/14	unidentified	02-09-2014	Bagidora Road	On Mango log	N-23^{0}37.033' E-074^{0}08.969' Elevation-274 m
Ud-97/14	unidentified	02-09-2014	Bagidora Road	On soil	N-23^{0}37.033' E-074^{0}08.969' Elevation-274 m
Ud-98/14	unidentified	19-09-2014	Udaipur	On soil	N-24^{0}33.995' E-073^{0}42.538' Elevation- 653m

Vellayani Centre

Collection identification and conservation of wild edible mushrooms

About 65 wild specimens have been collected from six districts of Kerala state and one from Srilanka (Table 5.9). The duplicate have been discarded of the following seventeen specimen and have been cultured. The cultures along with basic data have been sent to DMR for obtaining accession numbers which will be presented during the annual workshop.

Ranchi Centre

Impact of Wild edible Mushrooms on the Social Livelihood improvement in Tribal women

In Jharkhand, number of wild edible mushrooms are distributed throughout the wild/forest area where plants are dense and soil is acidic. In these areas, wild edible mushrooms are profusely distributed. These edible mushrooms generally observed in rainy season particularly July-September in the forest/

Table. 5.9. Germplasm collected by Vellayani centre

S. No.	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data
1	*Calocybe*	9-7-2014	Thruvallam	Coconut basin	Latitude 8.56°N; Longitude 77.98°E
2	*Xylaria*	23-11-2014	Sri lanka	Banyan tree	Latitude 6.931 °N; Longitude 79.84°E
3	*Pleurotus tuber-regium*	24-12-2014	Kunnukuzhi	Fallen mango branch	Latitude 8.66°N; Longitude 76.78°E
4	*Lycoperdon*	2-10-2014	Veganoor	Grass land	Latitude 8.400 °N; Longitude 76.97°E
5	*Amanita*	2-10-2014	Veganoor	Open ground	Latitude 8.400 °N; Longitude 76.97°E
6	*Termito myces*	17-8-2014	Wayanad	Dense forest area	Latitude 11.70 °N; Longitude 76.09°E
7	*Auricularia*	17-11-2014	Vellayani	Fallen tree	Latitude 8.43°N; Longitude 76.98°E
8	*Tricholoma*	6-7-2014	Nedumangadu	Marshy land	Latitude 8.60 °N; Longitude 77.00 °E
9	*Coprinus*	17-8-2014	Wayanad	In grass wood scattered over grass land	Latitude 11.70 °N; Longitude 76.09°E
10	*Pleurotus dryinus*	1-9-2014	Idukki	Dry parts of delonix regia	
11	*Marasmius*	11-8-2014	Kunnukuzhi	Petiole of coconut dwarf palm	
12	*Polyporus*	1-9-2014	Munnar	Spread over grass land	
13	*Ganoderma*	28-8-2014	Ernakulum	Adhering to stump of neem tree	Latitude 10.01°N; Longitude 76.30°E
14	*Pleurotus populinus*	17-8-2014	Wayanad	Hilly areas	Latitude 11.70 °N; Longitude 76.09°E
15	*Hypsizygus*	2-9-2014	Idukki	De compost paddy straw	
16	*Agaricus*	24-4-2014	Patna	Discarded beds after cultivation	
17	*Lentinus giganteum*	17-8-2014	Wayanad	Litter in deforest area	Latitude 11.70 °N; Longitude 76.09°E

jungle. The groups of tribal women get up early for hunting of wild edible mushrooms in the rainy season. They collect wild edible mushrooms separately but sold jointly because collections of the individual are quite small. After collection in the early morning, they are sold in the local market or in the urban market on the premium rates in the afternoon of the same day of collection. An Interview of the Tribal women who are mushroom hunter have conducted to know the impact of wild edible mushrooms on the upliftment of their social livelihood, indicated that wild edible mushroom play greater role in the up-liftment of their social livelihood. During rainy season they earned nearly Rs 3000-4000/-per month depending upon collection. In the wild edible mushrooms, Rugra or Puttu (*Geastrum*), *Termitomyces* (Khukri) have greater proportion in their collection while other wild edible mushroom viz., Jamun Khukhari (*Boletus*), *Amanita*, Oyster and *Macrolepiota* in little proportion (Fig. 5.4). Rugra and *Termitomyces* are sold at a premium price as compared to other mushrooms like Jamun Khukhari (*Boletus*), Oyster and *Macrolepiota* etc. As per view

Fig. 5.4. Tribal women's collected edible mushrooms from Gumla edible mushroom from the Forest of Jharkhand and selling in the market Wild (a. *Termitomyces microspores*, b. Rugda, c. *Termitomyces* d. *Amanita*, e, f. g. Rugra and *Termitomyces*, Rugra)

of the consumers of wild edible mushroom, the tastes of wild edible mushroom are very unique and ultimate as compared to cultivated mushrooms.

Pasighat Centre

In the month of June and August 2014 market survey was conducted during rainy season (Table 5.10; Fig 5.5). Tribal people are collecting the mushroom from the edible fruit trees of various places and sold in the market the price of the mushroom is Rs. 200/ kg. If the edible mushroom spp. appears on the non edible fruit trees it caused them gastroentero problem (It is indigenous technology of local tribal peoples). Five places *viz*., Ruksin, Bodak, Yagrun and Merum, Nari, Name village of were selected for operation (Table 5.11). Wild mushroom species were surveyed and collected during rainy season in jungle, deep forest decayed wooden trees and road side plantation also (Table 5.12; Fig 5.6). Out of these, twenty seven spp. were collected from different places of Arunachal Pradesh (Table 5.13). Four edible species were focussed during survey *viz*., *Pleurotus* spp, Shiitake, Milky and *Schizophyllum* mushrooms remaining

Table 5.10. Market survey after rainy days

S.No	Date of Visit	Mushroom sp	Rs./kg
1.	10th June 2014	Oyster	200
2.	25th June, 2014	Oyster, Shiitake	200, 180
3.	14thAugust, 2014	Oyster, Shiitake	200, 180


Fig. 5.5. Market survey on 25th June and 14th August 2014, Shiitake mushroom in the market. Locally produced mushroom in the market

Table 5.11. Market survey report of Arunachal Pradesh

S. No.	Item to be recorded	Observation/data
1.	Name/market/District	Pasighat, Ruksin, Bodak, Merum local market
2.	Date of collection	June, July and August
3.	Sale price (Rs./Kg)	Wild edible Rs.180, Cultivated Oyster mushroom 200/Kg
4.	Mode of consumption (fresh/dried/both/raw/ cooked as vegetable/with rice etc.)	Mostly fresh consumption, some time used with leafy vegetables dried Shizopyllum was used as chatney, Cooked as vegetable, boiled food
5.	Any association with tree(s)/soil type etc.	Cesar tree (local name)/ black soil for milky mushroom
6.	ITK if any	Local people eat boil mushroom only
7.	Temperature range during the collection period	25-30 ^{0}C

Table 5.12. Mushroom sp collected from Arunachal forest.

S. No	Species	Date of collection		
		11th April, 2014	15th June, 2014	27th June, 2014
1.	Milky mushroom	-	-	1
2.	Oyster	2	-	2
3.	Shiitake	1	2	-
4.	*Schizophyllum*	1	-	-
5.	*Polyporus*	2	2	2
6.	Others	4	5	3
7.	Total	10	9	8

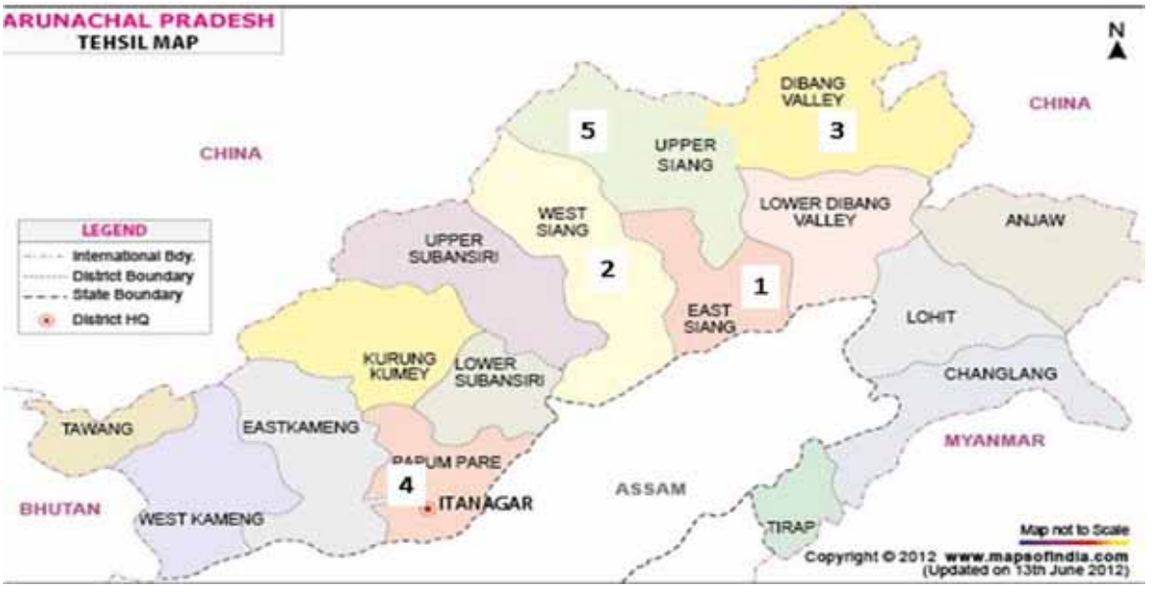


Fig. 5.6. Areas surveyed in Arunachal Pradesh for collection of germplasm (1. East Siang; 2. West Siang; 3. Dibang valley; 4. Papum pare; 5. Siang)

Table 5.13. Data of mushroom collected by Pasighat Centre

Sl. No.	Name of mushroom	Date of collection	Locality	Substrate	Character	GPS data
1	CHF-2014_14	29.04.14	Ayang (Mebo)	Soil	Present in group, a smell and spore print coloured	280 08' 23.5" N 095020'23.6 E Altitude 264
2	CHF-2014_15	29.04.14	Ayang (Mebo)	wood	Present in group, have no smell	280 08' 23.8" N 095020'19.8 E Altitude 285
3	CHF-2014_16	29.04.14	Ayang (Mebo)		-	280 08' 27.6" N 095020'20.5 E Altitude 311
4	CHF-2014_17	29.04.14	Ayang (Mebo)	Soil	Present in group, a smell and spore print is coloured	280 08' 27.6" N 095020'20.5 E Altitude 311
5	CHF-2014_18	29.04.14	Ayang (Mebo)	Soil	Present in group, a smell and spore print is coloured	280 08' 27.6" N 095020'20.5 E Altitude 311
6	CHF-2014_19	29.04.14	Ayang (Mebo)	wood	Present in group, no smell, Stipe Central, Cream, 2 inch long	280 08' 23.8"N 095020'19.8E Altitude 285
7	CHF-2014_20	29.04.14	Ayang (Mebo)	wood	Present in group, no smell and spore print coloured	280 08' 23.8" N 095020'19.8E Altitude 285

spp. were poisonous and nutritive. All the edible mushrooms are collected from edible fruit trees. Spore print was prepared. The entire edible species are attempted to culture in the laboratory. Few of them were cultured and spoiled due to electricity problem during maintenance. Rainfall and temperature data coinciding with the appearance/arrival of wild edible mushrooms in local markets. Mushrooms are in the market exactly 2-3 days after rainfall. Market survey was conducted shortly after rainfall. The details are given below.

Out of these, twenty seven spp. were collected from different places of Arunachal Pradesh. Four edible species were focused during survey *viz*., *Pleurotus* spp, Shiitake, Milky and Schizophyllum mushrooms remaining spp. were poisonous and nutritive. All the edible mushrooms are collected from edible fruit trees. Spore print was prepared. The entire edible species are attempted to culture in the laboratory. Few of them were cultured and spoiled due to electricity problem during maintenance.

Additional all the poisonous and edible mushrooms species are documented and reserved in the mushroom museum (at Department of Plant Protection, Section Plant Pathology, Spawn and Mushroom Production Laboratory, College of Horticulture and Forestry, CAU, Pasighat) for ready reference (as far as this supplementary than 250 species are reserved in the museum). The mushrooms are surveyed and the details are given in Table 5.11. Survey was conducted in the forest area during rainy season. Five surveys were conducted during 2014-15. The details are given in Figure 5.6.

Pusa Centre

The survey was conducted during the year 2014-15 in Samastipur district of Bihar. A total of 4 germplasm were collected and identified and 2 germplasm of them were submitted to DMR solan. All three *Tricholoma giganteum* and *A. bisporus* were cultured on PDA and attempts will be made for cultivation (Table 5.14).

Table 5.14. Germplasm collected at Pusa centre

Sl. No.	District	Germplasm	Number	Month
1.	Samastipur	*Volvareilla volvacea*	1	May 24th 2014
2.	Muzaffarpur	*Calocybe indica*	1	Aug 11th 2014
3.	Samastipur	*Tricholoma giganteum*	1	Aug 18th 2014
4.	Samastipur	*Agaricus bisporus*	1	Sept. 08th 2014
	Total		**4**	

As per mandate of the AICRP the collected germplasm may be submitted to DMR with details. As such 2 mushroom cultures were submitted to DMR (Table 5.15).

Table 5.15. Germplasms submitted to DMR Solan

Sl.	RAU Name	Identification	DMR ACC No. & identificate	Identification
1.	CIP-13-18	*Tricholoma giganteum*	DMR0636(12.11.14)	*Calocybe indica*
2.	AB-12-01	*Agaricus bitorquis*	DMRAB-11(11.11.14)	*Agricus* sp.

Coimbatore Centre

During 2014-15, survey for wild mushroom was continued in Varusanadu and Bodinaickenur range in Theni district (Latitude: between 9.37° and 10.15° N; Longitude: between 77.10° and 77.4° E); Sirumalai range in Dindigul district (Latitude: between 10.07° and 10.21° N; Longitude: between 77.59° and 77.68° E);

Kinathukadavu in Coimbatore district (Latitude: 10.49° N and Longitude: 77.01°E) and Coonur in the Nilgries district (Latitude: 10.49° N and Longitude: 77.01°E) of Tamil Nadu. A total number of 15 specimens of gilled fungi and polypores have been collected and tentatively identified as *Cordyceps* sp., *Coriolus versicolor, Amanita muscaria, Volvariella bombycina, Volvariella volvacea, Pleurotus djamor, Pleurotus platypus, P.dryinus, Pleurotus* sp., *Pisolithus albus, Ganoderma lucidum, Auricularia auricula, Lycoperdon esculentum* and *Calocybe indica* (3 isolates). Isolation and pure culturing of these fungi have been made in PDA and Mushroom growth medium. Spore prints and dry specimens wherever possible were preserved. Pure cultures will be handed over to National Repository at DMR, Solan along with passport data. As a rare record in South India, occurrence of a kind of morel, tentatively identified as *Morchella conica* was observed in the month of Jan.2015 at high fields estate, Coonur, in the Nilgires district. During this period the ambient temperature in the local area was around 0°C to -2°C.

Pantnagar Centre

- Passport data, photographs and dried sample of all the specimens collected (28 Nos.) were submitted to DMR, Solan (Table 5.16)
- Spore print of Pantnagar Sample No. 1/14, 2/14, 5/14, 6/14, 7/14, 8/14, 10/14, 11/14, 14/14, 15/14 and 25/14 were submitted to DMR, Solan.
- Pure culture of Pantnagar Sample No. 1/14 2/14, 3/14, 4/14, 6/14, 15/14,16/14,17/14 and 28/14 were submitted to DMR, Solan and accession number allotted (Table-5.17).

Table 5.16. List of wild germplasm collection

Sample No.	Name	Location	Sample No.	Name	Location
1/14	*Pleurotus* sp.	Pantnagar	15/14	*Pleurotus* spp.	Haripur (Ddn)
2/14	*Auricularia*	Rudrapur	16/14	*Russula* spp.	Tonia, (Ddn)
3/14	Pink oyster	Pantnagar	17/14	*Ganoderma sp.*	Koti local (Ddn)
4/14	*Lenitnus*	Pantnagar	18/14	*Mycena spp.*	Koti local (Ddn)
5/14	*Calocybe* spp	Pantnagar	19/14	*Suillus luteus*	Koti local (Ddn)
6/14	*Volvareilla* spp.	Pantnagar	20/14	*Lactarius indigo*	Vyasbhund (Ddn)
7/14	*Lentinus*	Pantnagar	21/14	*Lactarius tabidus*	Vyasbhund (Ddn)
8/14	*Lentinus* spp.	Pantnagar	22/14	*Entoloma corvinum*	Tanakpur
9/14	*Scleroderma* sp.	Ramnagar	23/14	*Conocybe* spp.	Tanakpur
10/14	*Pleurotus* sp.	Deema range Ramnagar	24/14	*Clavicorona pyxidata*	Tanakpur
11/14	*Agaricus* sp.	Chimptakhal	25/14	*Volvariella* spp.	Tanakpur
12/14	*Boletus aureissimus*	Chimptakhal	26/14	*Mycena spp.*	Tanakpur
13/14	*Geastrum triplex*	Ramnagar	27/14	*Daldinia* spp.	Tanakpur
14/14	*Russula* spp.	Ramnagar	28/14	*Termytomyces* spp.	Pantnagar

Pleurotus spp. | *Auricularia* spp. | *Pleurotus* spp. (pink) | *Lentinus* spp.

Calocybe spp. | *Volvariella* spp. | *Lentinus* spp. | *Lentinus* spp.

Scleroderma spp. | *Pleurotus* spp. | *Agaricus* spp. | *Boletus aureissimus*

Gaestrum triplex | *Russula* spp. | *Pleurotus* spp. | *Russula* spp.

Ganoderma spp. | *Mycena* spp. | *Suillus luteus* | *Lactarius indigo*

Lactarius tabidus | *Entoloma corvinum* | *Conocybe* spp. | *Clavicorona pyxidata*

Volvariella spp. | *Mycena* spp. | *Daldinia* spp. | *Termytomyces pyxidata*

Fig. 5.7. Mushroom germaplam collected by Pantnagar centre

Table 5.17. List of accessions number alloted

Sl. No.	Acc. No.	Sample No.	Dated
1.	DMRO-637	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 1/14	12-11-14
2.	DMRP-308	Dr Kushwaha, and Dr. Mishra, GBPUAT, Pantnagar sp no 3/14	12-11-14
3.	DMRO-638	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 4/14	12-11-14
4.	DMRO-639	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 6/14	12-11-14
5.	DMRO-640	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 15/14	12-11-14
6.	DMRO-641	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 17/14	12-11-14
7.	DMRO-642	Dr Kushwaha, and Dr Mishra, GBPUAT, Pantnagar sp no 28/14	12-11-14

Ludhiana Centre

Wild mushroom flora was surveyed in the districts of Punjab during the months from July to September, 2014. One edible mushroom was collected from Ludhiana (Table 5.18; Fig. 5.8).

Table 5.18. Mushroom collected and identified by Ludhiana Centre

Specimen no.	**1**
Date of collection	**August 22, 2014**
Locality	**PAU Campus**
GPS Data	
Longitude	**30°N 75°'E,**
Lattitude	**56'N 40'E**
Altitude	**20"N 13"E**
Single, in groups or connate (United)	**In groups**
Habitat (Humus, wooden stumps or trees, dung, sand, or any other)	**Humus dead leaves**
Smell (Y/N)	**Y**
Spore print colour	**Black**
Cap	
Colour	**Creamy white**
Diameter	**6-10cm**
Shape	**Round**
Scales / smooth/any other	**Smooth**
Stipe	
Central, lateral or excentric	**Central**
Colour	**Cremy white**
Stipe size and length	**2.5cm dia, 12-15cm**
Stipe base	**Blunt bulby**
Ring present or absent	**Absent**
Volva present or absent	**Absent**
Veil present or absent	**Absent**
Basal association	**No**

Lamellae (incase of gill fungi) Scale on cap: gills, tooth, tubes, pores	**Lamellae radiant**
Attachement: Free, adnasced (just tocuching stem), adnate (broad by attached), Shortly decurrent (running on the stem apex)	**Adnexed**
Gill colour	**Creamy white**
Gill Edges	
Edibility (edible/non-edible/ medicinal/ poisnous)	**Edible**
Photograohs of natural specimen showing habitat and after taking out from the soil showing cap, stem, ring, gills, volva and stem base	**See Figure 1**

Fig. 5.8. Wild mushroom collected by Ludhiana centre

6. EXTENSION ACTIVITIES

Bhubaneshwar Centre

During 2014-15, eighteen trainings including nine of AICRP on Mushroom with a total of 420 trainees have been conducted on mushroom cultivation and processing and mushroom spawn production at OUAT, Bhubaneswar. Lecture-cum-demonstration programme were attended at 17 locations involving 1492 trainees on mushroom cultivation, out of which 597 were ladies belonging to different self help groups. The centre participated in 11 Krishi exhibitions. Besides, 13 TV/ radio programmes were under taken during the period on mushroom cultivation and processing and spawn production. The scientist also participated in 20 farmer-scientist interaction programme.

Table 6.1. On-campus Training: AICRP on Mushroom, Bhubaneswar

Sl. No.	Date	Venue	No. of farmers participated	Particulars	No. of lady participants
1.	22.04.2014-26.04.2014	OUAT	30	Mushroom cultivation and processing	3
2.	5.05.2014-14.05.2014	OUAT	9	Mushroom spawn production	2
3.	4.08.2014-8.08.2014	OUAT	20	Mushroom cultivation and processing	2
4.	18.08.2014-22.08.2014	OUAT	46	Mushroom cultivation and processing	6
5.	22.12.2014-31.12.2014	OUAT	15	Mushroom spawn production	5
6.	27.01.2015-31.01.2015	OUAT	41	Mushroom cultivation and processing	8
7.	5.02.2015-9.02.2015	OUAT	10	Mushroom cultivation and processing	-
8.	18.02.2015-27.02.2015	OUAT	20	Mushroom spawn production	5
9.	16.03.2015-20.03.2015	OUAT	25	Mushroom cultivation and processing	3
	Total		**216**		**34 (16%)**

Table 6.2. On-campus Training: CTMRT, Bhubaneswar

Sl. No.	Date	Venue	No. of farmers participated	Particulars	No. of lady participants
1.	27.05.2014-31.05.2014	OUAT	16	Mushroom cultivation and processing	-
2.	16.06.2014-25.06.2014	OUAT	15	Mushroom spawn production	3
3.	8.09.2014-17.09.2014	OUAT	16	Mushroom spawn production	5
4.	27.10.2014-31.0214	OUAT	35	Mushroom cultivation and processing	5
5.	10.11.2014-14.11.2014	OUAT	25	Mushroom cultivation and processing	4
6.	8.12.2014-12.12.2014	OUAT	37	Mushroom cultivation and processing	7
7.	13.01.2015-22.01.2015	OUAT	15	Mushroom spawn production	-
8.	23.02.2015-27.02.2015	OUAT	24	Mushroom cultivation and processing	2
9.	9.03.2015-18.03.2015	OUAT	21	Mushroom spawn production	3
	Total		**204**		**29 (14%)**

Table 6.3. Lecture-cum-demonstrations at Bhubaneshwar

Sl. No.	Date	Venue	No. of participants	Female	Male	Composition of participants
1.	5.04.2014	PPL Training centre, Bhubaneswar	25	25	0	Farmers of Khurda
2.	20.04.2014	PPL Training centre, Bhubaneswar	25	25	0	Farmers of Kendrapara
3.	28.04.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Mayurbhanj
4.	5.05.2014	PPL Training centre, Bhubaneswar	25	25	0	Farmers of Jagatsinghpur
5.	12.05.2014	PPL Training centre, Bhubaneswar	35	35	0	Farmers of Khurda
6.	16.05.2014	Chandrasekharpur, Bhubaneswar	25	5	20	Farmers of Odisha
7.	16.05.2014	Global Bio tech., Tamando, Bhubaneswar	40	20	20	Biotech students of Bhubaneswar
8.	23.05.2014	CTMRT, OUAT, Bhubaneswar	30	0	30	Farmers of Keonjhar
9.	11.06.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Kendrapara
10.	12.06.2014	PPL Training centre, Bhubaneswar	30	0	30	Farmers of Keonjhar
11.	17.06.2014	PPL Training centre, Bhubaneswar	25	25	0	Farmers of Khurda
12.	24.06.2014	RUDSET, Bhubaneswar	27	27	0	Farmers of Khurda
13.	6.07.2014	CARD, Khurda	40	40	0	Lady Farmers of Khurda
14.	9.07.2014	IMAGE, Bhubaneswar	20	0	20	Farmers of Khurda
15.	20.07.2014	Pipli, Puri	25	25	0	Lady farmers of Puri
16.	28.07.2014	RUDSET, Bhubaneswar	30	30	0	Lady Farmers of Khurda
17.	29.07.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Angul
18.	8.08.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Bolangir
19.	14.08.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Balasore
20.	14.08.2014	ABM, Utkal University, Bhubaneswar	60	30	30	Students of ABM
21.	16.08.2014	Nayagarh	50	50	0	Tribal women of Nayagarh
22.	23.08.2014	CIFA, Bhubaneswar	30	15	15	Farmers of Odisha
23.	25.08.2014	CDB, Bhubaneswar	25	0	25	Farmers of Khurda
24.	29.08.2014	CIFA, Bhubaneswar	20	5	15	Farmers of Odisha
25.	2.09.2014	CDB, Bhubaneswar	50	25	25	Farmers of Odisha
26.	9.09.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Keonjhar
27.	10.09.2014	CDB, Bhubaneswar	25	0	25	Farmers of Khurda
28.	26.09.2014	KVK, Nuapara	60	10	50	Farmers of Nuapara
29.	6.10.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Khurda
30.	17.10.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Sambalpur
31.	21.10.2014	CDB, Bhubaneswar	20	0	20	Farmers of Balasore
32	24.09.2014	CDB, Bhubaneswar	20	0	20	Farmers of Khurda
33.	29.11.2014	CRPF, Bhubaneswar	100	50	50	Staff of CRPF
34.	3.12.2014	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Bargarh
35.	5.01.2015	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Jajpur
36.	12.01.2015	IMAGE, Bhubaneswar	25	20	5	Farmers of Balasore
37.	14.01.2015	IMAGE, Bhubaneswar	25	20	5	Farmers of Balasore
38.	26.01.2015	CTMRT, OUAT, Bhubaneswar	20	5	15	NSS officers
39.	5.02.2015	PPL Training centre, Bhubaneswar	25	0	25	Farmers of Deogarh
40.	7.02.2015	CDB, Bhubaneswar	25	0	25	Farmers of Cuttack
41.	18.02.2015	CRPF, Bhubaneswar	60	40	20	Staff of CRPF
42.	3.03.2015	ATMA,Khurda	20	20	0	Farmers of Khurda
43.	23.03.2015	PPL Training centre, Bhubaneswar	30	0	30	Farmers of Kalahandi
		Total	**1492**	**597 (40%)**	**895 (60%)**	

Table 6.4. Mass communication

Sl. No.	Item	Number	Remarks
1.	Participation in Krishi-exhibition	11	Organised in 10 districts of the State
2.	TV / Radio programme	13	DD1, DD6, ETV (Odia),AIR and Radio Kishan
3.	Popular articles	06	-
4.	Publication of leaflets/ booklets	03	-
5.	Farmers-scientist interaction	20	5523 farmers participated, out of 50% were ladies
6.	Field day	01	Conducted at Rashmirekha mushroom, Pipli, Puri

Exposure visit of farmers

A total number of 1196 farmers including Govt. functionaries, teachers, scientist, school, college students and media personnels visited the centre during 2014-15 and were apprised of the activities of the centre. Eight Govt. officers from Nepal also visited the Centre during the period under report. 23 % of the total visitors were women.

Table 6.5. Exposure visit of farmers (state wise break-up)

Sl. No.	State	No. of visitors	Share (%)
1.	Odisha	926	77
2.	West Bengal	100	8
3.	Mdhya Pradesh	42	4
4.	Andhra Pradesh	40	3
5.	Chhatigarh	28	2
6.	Pondicherry	24	2
7.	Uttar Pradesh	20	2
8.	Meghalaya	8	1
	Total	**1196**	**99**

Table 6.6. Composition of domestic visitors

Sl. No.	State	No. of visitors	Share (%)
1.	Farmers	641	70
2.	Students of DAV schools of Bhubaneswar	250	26
3.	NSS programme officers	35	4
	Total	**926**	**100**

Monitoring of spawn production units

Fifteen spawn production centres have been monitored during the period under report on quality of the planting materials produced and necessary addressal of problems if any.

Table 6.7. Monitoring of spawn production units

Sl. No.	Date of visit	Spawn production units
1.	20.07.2014	Rasmirekha mushroom, Pipli, Puri
2.	13.09.2014	Spawn unit, Betnoti, Baripada
3.	13.09.2014	Spawn unit, Baripada
4.	27.09.2014	Samaleswari mushroom, Kulunda, Bargarh
5.	27.09.2014	Sapwn unit, Godbhaga,Baragarh
6.	18.10.2014	Rasmirekha mushroom, Pipli, Puri
7.	18.10.2014	Maa Mangala mushroom, Pipli, Puri
8.	8.11.2014	Ruchi mushroom, Baripada, Mayubhanj
9.	2.02.2015	KVK, Mayubhanj
10	2.02.2015	Ruchi mushroom, Baripada, Mayubhanj
11.	4.02.2015	KVK, Bhadrak
12.	12.02.2015	KVK, Kalahandi
13.	13.02.2015	KVK, Nuapara
14.	27.02.2015	Prabhu mushroom, Resinga
15.	11.03.2015	KVK, Sundargarh

Consultancy services

- Dr. K.B.Mohapatra is working as a member of technical team of the Agriculture Consultancy Support Service Cell (ACSSC), OUAT.
- Consultancy services extended to Socio Economic Development Association (SEDA) , Bhubaneswar for promotion of mushroom cultivation in Mahanga block in the district of Cuttack.

Involvement of NGOs

Sixty NGOs from Odisha and outside are involved in promotion of mushroom cultivation, processing and spawn production.

Visit of dignitaries

Table 6.8. Visit of dignitaries to Bhubaneswar centre

Sl. No.	Date	Visitors
1.	28.08.2014	Sanjeev Chopra, Mission Director, MIDH, New Delhi
2.	28.08.2014	Dr. S.K.Chadha, Director, Directorate of Horticulture, Odisha
3.	28.08.2014	Sri R. Santhagopalan, Director, Directorate of Agriculture, Odisha
4.	28.08.2014	Dr. P.K.Das, Dean, Directorate of Research, OUAT, Bhubaneswar
5.	5.11.2014	Dr. M.P.Thakur, Director, Extension Services, IGKV, Raipur
6.	21.12.2014	Shri Alok Mishra, PD, NCPAH, Dept. of Agriculture and Cooperation, GOI, New Delhi
7.	26.12.2014	Sri Tarailokya Nath Khuntia, DIG, CRPF, GC, Bhubaneswar
8.	17.02.2015	Dr. Noel Mager, Head, Unit Impact Acceleration Training Centre, IRRI, Philippines
9.	17.02.2015	Dr. Ahmad Salaluddin, IRRI Consultant, Bangladesh
10.	26.03.2015	Dr. S.S.Nanda, Dean, Directorate of Research, OUAT, Bhubaneswar

Quality spawn supply

A quantity of 1935 packets of spawn (387 kg) of Paddy straw and Oyster mushroom were distributed to the farmers @Rs.8.50/packet with a resource generation of Rs.16, 448.00.

Experiential Learning Programme

Seventy three numbers of final year B.Sc (Ag) students are being trained in mushroom cultivation, processing and spawn production during the current semester.

Farm Advisory Services

Advisory services were extended to large number of farmers through telephone calls/ personal contacts throughout the year on different aspects of mushroom cultivation.

Status of Mushroom in Odisha

Table 6.9. Information on different mushrooms and mushroom spawn of Odisha*

Sl. No.	Particulars	Information/ Production (t/year)	% of total production
1.	Paddy straw mushroom	8129	66
2.	Oyster mushroom	4095	33
3.	Button mushroom	110	1
4.	Total mushroom production	12334	100
5.	No. of spawn production units	210	-
6.	Total spawn production	2318	-
7.	No. of processing units	2	-

*Updated till 31.03.2014

Farmers' achievement

- Sri Sanjit Kumar Mohanty, Pipli, Puri was awarded as the best progressive farmer at the Global Social Science Conference, 2015 on " Management of Sustainable Livelihood Systems" held from 14-17 February, 2015 at OUAT, Bhubaneswar, Odisha.

Table 6.10. Participation in conference/ seminar/ workshop/symposium

Sl. No.	Particulars	Date	Venue
1.	State level workshop on "Protected cultivation"	1st March, 2014	Hotel Marion, Bhubaneswar
2.	State level seminar on " Protective Agro textile: Advantages and Future prospects"	14th March, 2014	Hotel VITS, Bhubaneswar
3.	XVI Annual workshop of AICRP on Mushroom	20-21st March, 2014	Rajendra Agriculture University, Pusa, Bihar
4.	State level workshop on "Production of Mushroom under Protected condition"	25th July, 2014	Directorate of Extension Education, OUAT, Bhubaneswar
5.	National symposium on " Management options for enhancing farm productivity and livelihood security under changing climate"	29-31st October, 2014	Indian society of Agronomy, Odisha chapter, OUAT, Bhubaneswar

Sl. No.	Particulars	Date	Venue
6.	8th International conference on "Mushroom biology and mushroom products:	19-22nd November, 2014	Organised by World Society of Mushroom Biology and Mushroom Products, Directorate of Mushroom Research and Mushroom Society of India, Solan at NASC, New Delhi
7.	Interactive workshop on "Use of bamboo based poly houses for horticultural activities"	22-23rd December, 2014	Organised by NCPAH, Dept. of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India, New Delhi at Hotel Marrion, Bhubaneswar
8.	Fourth International Conference on "Management of sustainable livelihood systems"	14-17th February, 2015	International Society of Extension Education, OUAT, Bhubaneswar

Faizabad Centre

In order to promote mushroom cultivation in eastern Uttar Pradesh concerted efforts were made through trainings, demonstrations, advisory services, participation in Kisan Mela, Kisan Gosthi and by supplying spawn to growers for cultivation of various species of mushroom in different seasons.

Number of growers trained 128

Table. 6.11. Training organized at Faizabad centre

S.No.	Title	Date	Place	No. of farmers
1	Milky mushroom production	04-04-2014	On-Campus	50
2	Mushroom Production Technique	10-04-2014	On-Campus	45
3	Paddy Straw Mushroom Production	04-7-2014	On campus	35
4	Mushroom production	06-07-2014	On Campus	30

Gosthies organized/participated : 02

Demonstration of mushroom stall in Kisan Mela : 01

S. No.	Date	Organized by	Place
1.	28-10-14 to 29-10- 14	NDUAT ,Faizabd	NDUAT, Campus

Number of visitors : 345

Demonstrations : 05

- Demonstration trial of milky mushroom at mushroom laboratory for visitors-01
- Village–Matera, Post, Khandasa, Distt. Faizabad –Milky mushroom-02 & Button Mushroom-02

Radio Talk

Mushroom Uttapadan, Aakashwani Faizabad, Dated - 05-08-2014.

Mushroom Ki Kheti, Aakashwani Faizabad, Dated - 30-12-2014.

Mushroom Field Visit **:** 6

Other activities

Fruiting bodies sale **:** 27.68 Kg

Spawn Production **:** 86.00 Kg

- Attended Kharif Action Plan formulation meeting of NDUAT,Kumarganj on 07-06-2014
- Attended Rabi Action Plan formulation meeting of NDUAT,Kumarganj on 17-10-2014
- Monthly Research Assessment meetings of Directorate of Research NDUAT, for discussion on progress.

Raipur Centre

Awadhiya G. K 2014. Documentary audio tape on “Mushroom Production Technology”

Radio and television talk: 02

Awadhiya G. K., 2014. Prospect of commercial mushroom production in Chhattisgarh. AIR, Raipur. Dt 7.12.2014.

Awadhiya G. K., 2014 Oyster mushroom utpadan ki Saral Vidhi. Telecast from Raipur TV studio on Oct.

Table 6.12. Farmers training through, mushroom day; Exhibitions; farmer and students group visits.

Sl. No.	Activity	No.	Duration	Organized by	Participation	Funded by
01	National Agriculture Science Kisan Mela organized by IGKV, Raipur	01	04 days	IGKV Raipur and State Govt. Chhattisgarh	10000	IGKV Raipur
02	Farmers group visit	10	01 day each	NHM,ATMA and State Agriculture Dept. CG, MP, Maharastra and Orissa	453	NHM,ATMA and State Agriculture Dept. CG, MP, Maharastra and Orissa
	Total				**10453**	

Table 6.13. Students visit to the Mushroom Research Lab IGKV, Chhattisgarh

1.	Students visit of Girls Degree college Raipur	60	One day	Funding
2.	Girls of Rehabilitation center Govt of CG Raipur	24	1 day	Organized by Respective School Administration
3.	Govt. High School, Amlidih, Raipur	57	1 day	Organized by Respective School Administration
4.	Student of Private Engineering College RIT Raipur	56	1 day	Organized by Respective School Administration
6.	Columbia College of Engineering and Management Raipur	55	1 day	Organized by Respective School Administration
7.	G. D Central University, Bilaspur	14	1 day	Organized by Respective School Administration
	Total	**266**		

Table 6.14. Students Training on mushroom and spawn production technology through experiential learning and Rural Agricultural Work Experience (RAWE)

Activity	Programme	Student No
Mushroom production technology and their diseases and pests control	RAWE/ Experiential Learning	72
Spawn production Technology precaution and importance.	-Do-	

On farm experiments

Three on farm experiment conducted in three villages on *Pleurotus florida*; *Pleurotus sajor-caju*, *Hypsizygus* spp. The performance of mushroom production was very good and growers were much excited to grow mushrooms and get good income.

VIPs Visit

- Hon'ble Vice Chancellor Dr. S.K. Patil, IGKV, Raipur visited mushroom research lab on Nov. 2014 and obtained information's regarding mushroom cultivation, processing and marketing activities.
- Dr. J. S. Urkurkar Director Research IGKV Raipur
- Dr. M. P. Thakur, Director Extension Services IGKV Raipur
- Dr. V. K. Kosta, DSW , IGKV, Raipur visited mushroom research lab on time to time and obtained informations regarding mushroom cultivation, processing and marketing activities.
- Dr. O.P. Kashyap, Dean, CoA, Raipur visited mushroom research lab on time to time and obtained informations regarding mushroom cultivation, processing and marketing activities.
- Dr. R. K. Dubedi, Dean, CoA, Kawardha visited mushroom research lab on time to time and obtained informations regarding mushroom cultivation, processing and marketing activities
- Director Forest Services, Chhattisgarh
- Dr. Humbarde, Director General CGCOST, Raipur, Chhattisgarh

- Shri Rajesh Mishra D. G. Central Jail, Raipur

Nauni Centre

Extension activities of Nauni centre

1. Lectures delivered in specialized training programmes, including farmers camps, short duration training courses -30

2. No. of farmers benefitted- more than 500

Fig. 6.1. Farmers training at Nauni Centre

Spawn production during the year 2014-15 : 6000 Kg (6 tons)

Mushroom production during the year 2014-15 : 2250 Kg (22.5 Qts.) Button mushroom
100 kg - Dhingri

TV Talks delivered

- Delivered TV talk on "Button mushroom ki kheti" on 9/2/15.
- Attended 12th Agricultural Science Congress at NDRI, Karnal w.e.f. 3-6 Feb.2015.
- Paricipated in Kisan mela at New Subzi Mandi, Solan on 10th and 11th March 2015.
- Paricipated in Mushroom mela at DMR, Chambaghat, Solan on 10th Sep. 2014

Murthal

Table. 6.15. Extension programmes by Murthal Centre

Number of Trainings on mushroom				
2010-11	2011-12	2012-13	2013-14	2014-15
9	11	9	14	16
Number of Trainees on Mushroom				
2010-11	2011-12	2012-13	2013-14	2014-15
450	431	419	692	818

Mushroom Spawn Production & Sale (in kg)

2010-11	2011-12	2012-13	2013-14	2014-15
44426	44600	39358	45832	48314

Production & Sale of Pasteurized Compost

2010-11	2011-12	2012-13	2013-14	2014-15
230141	343370	270208	290753	528293

Production & Sale of Casing Soil (in kg)

2010-11	2011-12	2012-13	2013-14	2014-15
4353.5	46272	32337	10265	45050

Compost & diseases samples analyzed

Compost	132
Disease & Pest	62

Fig. 6.2. Participation in Mushroom Mela at Solan

Fig. 6.3. Director visiting at Stall in Mushroom Mela

Fig. 6.4. Agriculture Mela in Rai

Fig. 6.5. Agri-Summit Leadership 2014-15

Fig. 6.6. Training activities at Murthal centre

Fig. 6.7. Disease survey activity at Murthal Centre

Pusa Centre

During 2014-15 period, a total of 3670 kg spawn was sold and increased 300 kg as compared to last year (3370 kg. The revenue of Rs. 366300 was generated by mushroom spawn, and mushroom sole and training charges (Table 6.16).

Table 6.16. Spawn sale, Revenue generated and mother culture supplied by Pusa Centre

Sl. No.	Spawn sale	2012-13	2013-14	2014-15
1.	Spawn sold	2875 kg	3370 kg	3670 kg
2.	Revenue generated (Rs.)	201250.00	303300.00	330300.00
3.	Mother culture supplied			2317 bottle (each 300g)

Training on Mushroom / Spawn Production

It is apparent from Table 6.17 that all together 10 training programmes were organized from April 2014 to March 31'2015 and a total of 289 trainees were trained in mushroom cultivation. The participated belongs to all categories of society. Out of 289 trainees, 197 female were also trained. A field visit was also organized during training programme. At the end of training one kg spawn with 5 polythene bags/Nylone net, Mushroom Book, Kisan Diary and Certificate etc. were distributed to among trainees. Feed back information resulted that all participants cultivated mushroom with 5-10 bags and harvested 10 kg fresh oyster mushroom. Some of them were sold 3-5 kg @ Rs. 150/kg besides own consumption. Out of these trainees 269 started mushroom cultivation with 10 kg oyster spawn. Seven trainees started button mushroom with 50 kg compost.

Table 6.17. Training programme on Mushroom cultivation

Sl. No.	Date	Venue	No. of days	No. of Participants			Adoption Impact
				Male	Female	Total	
1.	25.06.14 to 30.06.14	RAU, Pusa	6 days	9	16	25	36(+11)
2.	08.09.14 to 13.09.14	RAU, Pusa	6 days	6	20	26	42(+16)
3.	15.09.14 to 21.09.14	RAU, Pusa	6 days	6	24	30	34(+4)
4.	05.11.14 to 11.11.14	RAU, Pusa	6 days	27	3	30	25(-5)
5.	24.12.14 to 29.12.14	RAU, Pusa	6 days	8	9	17	-
7.	19.01.15 to 21.01.15	RAU, Pusa	3 days	15	31	46	50(+4)
8.	22.01.15 to 28.01.15	RAU, Pusa	6 days	9	30	39	52(+13)
9.	23.02.15 to 25.02.15	RAU, Pusa	3 days	4	32	36	30(-6)

Six on campus one day training cum awareness programme were also organized (Table 6.18) and a total of 227 farmers including 125 women learned production, protection and management of oyster mushroom and Dudhia mushroom.

Six Kisan gosthi were organized during the reporting period (Table 6.19) and a total of 401 farmers participated, out of these 167 women also attended the programme. They were exposed to production, consumption and marketing of mushroom. They were also interacted with progressive mushroom growers. Sixth Kisan Gosthi is scheduled to be held on 22.03.2015 in Gaunna Block (W. Champaran) for tribals.

Table 6.18. On campus One day awareness cum Training programme on Mushroom Production

Sl. No.	Date	Venue	No. of Participants			Sponsored by
			Male	Female	Total	
1.	May 29th 2014	RAU Pusa	7	5	12	AICRP, RAU
2.	June 3rd 2014	RAU Pusa	20	2	22	AICRP, RAU
3.	June 7th 2014	RAU Pusa	0	50	50	AICRP, RAU
4.	July 12th 2014	RAU Pusa	26	14	40	AICRP, RAU
5.	Aug. 12th 2014	RAU Pusa	12	28	40	AICRP, RAU

Table 6.19. Kisan Gosthi organized in Samastipur district

Sl. No.	Date	No. of Participants			Name village (District)
		Male	Female	Total	
1.	13th July 2014	24	53	87	Mohanpur (Samastipur)
2.	13th July 2014	73	40	113	Bidupur (Vaishali)
3.	July 20th 2014	11	42	53	Patori (Samastipur)
4.	July 27th 2014	98	12	110	Maniyarpur (E.Champaran)
5.	Aug 3rd 2014	18	20	38	Lohasari (Muzaffarpur)

Year wise mushroom spawn demand is presented in Table 6.20. Result indicated that during inception of AICRP 2009-10, the demand was 950 kg which drastically increased up to 3670 kg during 2014-15. This demand clearly indicated that this increased due to training and awareness programme.

Year-wise adoption per cent is presented in Table 6.21. Result indicated that the adoption per cent was up to 93% of the importing training. More information collection is required for details.

Table 6.20. Increase in mushroom spawn demand since inception of AICRP

Year	Quantity sold (kg)
2009-10	950
2010-11	1490
2011-12	2210
2012-13	2875
2013-14	3370
2014-15	3670

Table 6.21. Adoption of mushroom production technology by trainees since inception of AICRP

Sl. No.	Year	Male	Female	Total	Adoption	% adoption
1.	2009-10	39	7	**46**	40	**87.0**
2.	2010-11	181	117	**298**	243	**81.5**
3.	2011-12	95	120	**215**	210	**97.7**
4.	2012-13	45	66	**111**	25	**22.5**
5.	2013-14	100	179	**279**	193	**69.17**
6.	2014-15	92	197	**289**	269	**93.08**

Visitors

Students

Primary level to Matric class : under Chief Minister Educational Tour from all district of Bihar : 2850

Farmers

A total of **4900** farmers were visited from Bihar, Jharkhand, UP and West Bengal.

VIP Visitors

- Dr. V.P. Sinha, Ex-Chairman, Extension, IARI, New Delhi visited mushroom centre on April 3rd' 2014 and appreciated the efforts made by the centre.
- Sri H.C. Seth, Expert Entrepreneurship visited the centre on April 6th 2014
- Senior IAS officer and Observer (Election Commission) from South India visited centre on April 17th' 2014
- Senior State Observer (Election Commission) visited mushroom centre on 22nd 2014
- Dr. V.P. Singh, Director Research, Dr V.K. Shahi, Dean FBS&H, Dr. V.K. Chaudhary, Chairman AB&MB and Dr Harsh Kumar Senior Prof AB&MB, RAU PUSA visited mushroom centre on May 2nd 2014 and review research activities.
- Dr. Santosh Kumar, University Prof., BRA University, Muzaffarpur visited mushroom centre on May 3rd 2014. He expressed his view on medicinal and summer button mushroom cultivation. He also appreciated the mushroom production activities during summer. He requested for establishment of a small demonstration unite in BRA University, Muzaffarpur.
- Team of Judges along with their families from Dalsingsarai (Samastipur) visited Mushroom centre on May 6th 2014. They first time seen the process of mushroom cultivation. They also purchased 1 kg dry oyster mushroom worth Rs 800.
- CO, Samastipur along with family visited centre on May 12th 2014. They learnt mushroom production and consumption technology.
- Dr. G.K. Garg, Dr R Mukhopadhya and Dr Dilip Joy, Member DBT Review committee visited mushroom centre on May 13th 2014.
- Sixty UG Students from MDDM college Muzaffarpur (BRA University) alongwith teaching staff visited mushroom centre on May 15th 2014.
- A total of 39 (20 girl and 19 boys) metric students from Samastipur Uchha Vidyalay visited mushroom centre on May 17th 2014.
- DCLR, Samastipur visited mushroom centre on May 20th 2014. He discussed about production and consumption of different mushrooms.

Fig. 6.8. Training programme at Pusa centre

- ❖ Dr. Ramesh Chandra Prof. of Plant Pathology, BHU, Varanasi visited Mushroom centre on June 13th 2014
- ❖ Dr. Anil Sharma and his wife Prof. of Patna University visited Mushroom centre on 11th July 2014.
- ❖ Dr. V.P. Singh, Director Research, RAU visited Mushroom centre on July 18th 2014 and reviewed the experiments under AICRP on Mushroom.
- ❖ Honb'le Vice Chancellor Dr. RK Mittal, Director Research Dr. Mithilesh Kumar, Dean, FBS&H and Co-ordinator MBA visited mushroom centre on Aug 7th 2014 and review the mushroom research.
- ❖ Election Observer and Special Observer visited mushroom centre on Aug 13th 2014.
- ❖ Dr. S.S. Raju, PS, NCAP and Nodal PI, Social Science Network Project ICAR, New Delhi visited mushroom centre on Aug 27th 2014.
- ❖ Sri C.P. Sinha, President Rajya Kisan Ayog, Patna visited mushroom centre on Sept.19th 2014.

Participation in Kisan Mela

- Mushroom stall was placed in State level **Kisan Mela** organised by RAU from 14th to 16th March 2015. A large number of farmers from Bihar, Jharkhand and UP and West Bengal visited Mushroom Hub. Growers from all over Bihar placed Mushroom Stall.
- Mushroom Jhanki awarded 1st prize in Republic Day 2015

Fig. 6.9. Mushroom Stall in Kisan mela

TV Talk : Seven

1.	Patna Doordarshan	-	
2.	Muzaffarpur Doordarshan	-	3
3.	ETV Bihar	-	2

News Paper Clipping

1. Biotechnology ki teen sadasyai team ka bhrman.Prabhat Khabar May 14th 2014 (P-04)
2. DOT ki mulyankan team ne kiya VV ka nirinkshan.Hindustan May 14th2014 (P-04)
3. Mehnat se judi taknik GOBAR CHAHTTA hui ajij. Dainik Jagran.May 12th 2014 (p-12)
4. Mushroom plant dekhane pahuche Dy PD Nideshak. Hindustan May 26th 2014 (P-06)
5. Garmi me kare Dudhia mushroom ka kare utpadan Hindustan (May 30th 2014 (P-04).
6. Sarkar va krishko ke beech setu ka kare kam. Hindustan May 30th 2014 (P-07)

7. Kisano ne seekhe Mushroom utpadan ke gur. Hindustan June 4th 2014 (P-04)
8. Kuposan se Mukabla karega mushroom. Dainik jagran June 24th 2014 (P-08)
9. Badalte parivesh me mushroom byavsaybehtar vikalp: Dean.Hindustan, June 26th 2014 (P-04).
10. Mushroom ki kheti ke gur seekhane aye kshatra. Dainik Jagran. June 26th (p-09)
11. Paustik and aushadiya guno se bharpoor hai mushroom. Dainik Jagran. Jul 1st 2014 (P-07)
12. Vishvavidyalay ke doot ke roop me karya kare: Dean. Hindustan Jul 1st 2014 (p-05) .
13. Byavsayik roop se labhkari haiMushroom: Shahi. Prabhat Khabar. Jul 4th 2014 (p-04)
14. Utpadako ne kiya lab me pratakshan. Prabhat Khabar. Jul 11th 2014.(P-15).
15. Nepal ke kisano ne seekhe Mushroom utpadan ke gur. Hindustan 13th 2014 (p-06)
16. Mushroom se hi parvarish: Lal Babu singh. Prabhat Khabar. Jul 14th 2014 (P-04).
17. Kisano ko mili mushroom utpadan ki jankari. Dainik Jagran, Jul 22nd 2014 (P-08)
18. Mushroom ke liye Ganga Diare ki jalvayu hai anukul. Hindustan. Jul 22nd 2014 (P-07)
19. Mushroom ki kheti ke liye kisano ne kasi kamar. Prabhat Khabar Jul 23rd 2014 (p-07)
20. Kisano ne seekhe Mushroom utpadan ke gur. Dainik Jagaran 28th 2014 (p-02)
21. Arthik sudhrinikaran ka behatar vikalp hai mushroom utpadan. Hindustan Aug 13th 2014 (P-06).
22. Kisan hi vv ki poonji: Dr Chaudhary. Prabhat Khabar. Aug 31st 2014 (p-06).
23. Kisano ko takneeki jyan se seenchte hai Vajyanik. Hindustan. Aug 31st 2014 (P-04)
24. Kam lagat se Jyada munapha: Adisthata. Prabhat Khabar. Sept 9th 2014 (P-05)
25. Mushroom vyavsay arthik majbooti ka behtar vikalp. Sept 9th 2014(p-04).
26. Doot banker karya kare Mahilaye: Dean. Prabhat Khabar. Sept 14th 2014(P-04)
27. VVke doot banker karya prashikkshanarthi :Dean. Hindustan Sept 14th (p-07).
28. Prayatnasheel rahe mushroom utpadak : Dean. Prabhat Khabar. Sept 16th 2014(P-10)
29. Mushroom utpadan ka prashikkshan suru. Hindustan, Sept 20th 2014 (P-04)
30. Mahilaye nibhaye doot ki bhumika. Prabhat Khabar. Sept 22nd 2014 (p-06)
31. Samooh bana mushroom utpadan ko de badhava: Dr Chaudhary. Hindustan. Sept 22nd 2014 (P-04)
32. Kisan badhege to hoga vikash: Nitish.Hindustan, Sept 25th 2014 (P-02)
33. Mantri ka prakhand bana mushroom model. Dainik Jagaran. Sept 29th 2014(P-09)
34. Mushroom ne parivar ko jeene ki nayee rah dikhayee. Uvashakti. Oct. 8th 2014 (P-02).
35. Nalanada ki Anita mother culture se mushroom beej banana me avval. Prabhat Khabar. Oct. 10th 2014 (P-05).
36. Dal se behatar buttan mushroom. Prabhat Khabar. Nov 3rd 2014 (P-04)
37. 37. Munaphavale bajar ki talash me Vishvavidhyalay. Dr. Chaudhary. Prabhat Phabar. Nov.6th 2014 (p-07).
38. Paustik avam gunvan hota haimushroom: Dean. Hindustan Nov.6th 2014 (P-08)
39. Mushroom plant dekhane Mohanpur ayePrashikshanarthi. Hindustan. Nov 10th 2014 (P-06).
40. Mushroom plant dekhane Mohanpur ayePrashikshu. Dainik Jagran. Nov 11th 2014(P-06).

41. V V ke doot banker karya kare mushroom ke master trainer. Nov. 12th 2014 (P-07)
42. Sthaniya Bajar me uplabdh hua mushroom. Prabhat Khabar. Dec 10th 2014. (p-06)
43. Mushroom ka vyavsayik roop samay ki mang: Dean. Hindustan, Dec. 12th 2014 (P-04)
44. Mushroom ki nayee prabhed ki kheti suru.Hindustan, Dec 22nd 2014 (P-06)
45. Foertune mushrooms in mahadalit backyard. The Telegraph, 23rd Dec 2014 (p-08)
46. Kshatro ne liya mushroom ka prakshikshan. Dainik Jagran Dec. 25th 2014 (P-05)
47. Mushroom vyavsay ka badha kraze. Hindustan Dec 25th 2014 (p-04)
48. Padhai ke sath Mushroom ki kheti me Kshatra dikha rahe hai ruchi. Prabhat Khabar. Dec.25th 2014 (p-4)
49. Begusarai ke kshatro ne dekha mushroom utpadan Kendra. Dainik Jagran Dec. 29h 2014 (P-08)
50. Khet bin kheti Takneek ka ejad. Dainik Jagran, Jan 6th 2015 (p-09)
51. Birauli Malpur ke Mahadalit utpadako ne pace kiya missal. Prabhat khabar Jan 6th 2015 (p-06)
52. Mushroom ki kheti se Rojgar v achhi amdani : Chaudhary. Dainik Jgran. Jan. 14th 2015.(p-09)
53. Button Mushroom ki mang adhik. Prabhat Khabar, Jan 15th 2015.(p-06)
54. Mushroom Utpadan kar Kisan Badal Sakte hai apni Arthik Halat. Hindustan Jan 20th 2015(p-04)
55. RAU me lagi Mushroom ki pradarshni. Dainik Jagran. Jan 20th 2015 (p-04)
56. Krishi V V ka sarahniya Kadam Mushroom utpadan: MLC. Prabhat Khabar.Jan 20th 2015.(p-06)
57. Mushroom prashikshan se prashikshanarthi Naraj. Prabhat Khabar.Jan 21th 2015(p-05)
58. Mushroom Rojgar ka hai sadhan. Hindustan Jan 21st 2015. (p-07).
59. Mushroom Rajya nahi Desh ki pahichan. Jan 22nd 2015.(p-06)
60. Prashikshan sivir: Team Leader ke roop me karya kare Prashikshnarthi. Hindustan, Jan 22nd 2015.(p-04)
61. Mushroom ke prati mahilao v yuvao ki badh rahi hai ruchi. Hindustan, Jan 23rd 2015.(p-04)
62. Mahilao memushroom utpadan takneek ko le Lalak: Dean.Prabhat khabar. Jan 23rd 2015(p-06).
63. Prishikshu mushroom utpadan Kendra dekhane aye Mohanpur.Hindustan, 24th 2015. (p-05)
64. Mushroom utpadan ka liya Jayja.Danik jagran Jan24 th 2015.(p-06)
65. Vividhikaran Krishi kshetra me Labhkari: Dr Chaudhary. Prabhat Khabar. Jan 29th 2015 (p-06)
66. Mushroom utpadan v vyauavsay ka behtar Vikalp. Dean. Hindustan, Jan 29th 2015. (p-07)
67. Sva rojgar ka behtar vikalp hai Mushroom. Hindustan, Feb4 th 2015. (p-04)
68. Krishimantri ke Prakhand me lagegi Mushroom beej utpadan unit. Dainik Jagran Feb 8th 2015 (P-8).
69. Ab vaijhanik tarike se hogi mushroom ki kheti. Dainik Jagran Feb.12th 2015 (P-04)
70. Manorama ne banaya 700 mahilao ka samooh. Prabhat Khabar. Feb 14th 2015(P-06).
71. Kisan Vaigyaniko ki punji, V V kisano ka mandir. Hindustan, Feb 24th' 2015 (P-4).
72. Mahilao ke liye mushroom utpadan Bardan. Prabhat Khabar Feb 26th' 2015 (P-4).
73. Garib va chhote Kisano ke liye vardan hai mushroom utpadan ka vyavsay. Hindustan. Feb 26th' 2015 (P-4).

74. Rajya ke 20 jilo se Adhik ka lagega Mushroom stall. Prabhat Khabar Prabhat Khabar March 10th, 2015 (P-4).

75. Kisan Mela 14-16 tak Mushroom utpadko ki lagegi pradarshani March 12th 2015 (P-4).

Barapani

Four trainings were conducted on mushroom cultivation which included farmers, entrepreneurs etc. Trainings were oriented towards spawn production, mushroom cultivation and postharvest management. Spawn was also provided to KVK's.

Table. 6.22. Trainings organized by Barapani Centre

S. No.	Activity	Date	Duration	No. of Participants
1.	Training on mushroom cultivation (Oyster)	17.05.14	1 day	Total: 12 (Male: 10, Female: 2)
2.	"Training on spawn production" under TSP and AICRP on Mushroom	24th to 28th June, 2014	5 days	Total: 10 (Male: 7, Female: 3)
3.	Training on mushroom cultivation (Oyster)	19.07.14	1 day	Total: 06 (Male: 1, Female: 5)
4.	"Spawn production and mushroom cultivation for women empowerment" under TSP and AICRP on Mushroom	24-28th Feb, 2015	5 days	Total: 18 (Male: 2 , Female: 16)

Table 6.23. Demonstrations, Exhibitions, Lectures etc.

S. No.	Activity	Date	No. of visitors
1.	Oyster Mushroom cultivation (Demonstration)	05.08.14	27
2.	Oyster Mushroom cultivation (Demonstration)	19.11.14	26
3.	Oyster mushroom (exhibition-Extension congress at ICAR Barapani)	08.11.14	Many
4.	Oyster Mushroom cultivation (Demonstration)	16.01.15	Many
5.	Oyster Mushroom cultivation (Lecture)	12.08.14	Many
6.	Production technology of mushroom for livelihood and nutritional security (Lecture)	06.08.14	Many
7.	Oyster Mushroom cultivation (Demonstration)- Farmers from Nagaland	19.03.15	24

Table 6.24. Revenue generation by Barapani Centre

S. No.	Commodity	Quantity	Amount (Rs.)
1.	Commercial Spawn	666 kg	58,264
2.	Mother spawn	25.6 kg	3,840
3.	Fresh Mushroom	143.4 kg	8,705
4.	Culture tubes	34 nos.	13,400
		Total	**84,209**

Fig. 6.10. Mushroom production training at Barapani Centre

Udaipur Centre

Training Programme

Table 6.25. On Campus Training programmes held from April 2014 to March 2015.

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1	21-04-2014 to 23-04-2014 (three days)	Oyster	Entrepreneurs 17	Paneri ki badi, bedla road, 1038, Gyan Nagar Sec:4, Post- Manar, Teh. Vallabh-nagar, Udaipur, 65, shree chand Abbanigali, Beawar.
2	26-05-2014 to 29-05-2014 (four days)	Oyster & Milky	Farmers 11	128, Ambamata, Udaipur
3	18-06-2014 to 20-06-2014 (Three days)	Oyster & Milky	Farmers 13	Gav: Khed Mandir road, post;-tilwada, Badmer, Village: Umri, Teh: Karala, Bhilwara, VPO. Pindawal, The: Sabla, Dungarpur.
4	25-06-2014 to 27-06-2014 (Three days)	Oyster & Milky	Farmers 08	The: Shivganj, Village Teleta, Sirohi, Banswara, Rajasthan
5	01-07-2014 Three days	Oyster & Milky	Entrepreneurs 5	02/102 Vashali Appartment, Sec-04, Udaipur.
6	07-07-2014 to 10-07-2014 (four days)	Oyster & Milky	Entrepreneurs 16	Kheroda, 28, Amal ka kata Udaipur, The: Rjgad, Distt: Alwar.
7.	15-07-2014 to 18-07-2014 (four days)	Oyster	Entrepreneurs 04	V-P Thana, The:Kherwara, Udaipur, Sanjay Colony, Bhilwara
8.	22-07-2014 (Three days)	Oyster	Entrepreneurs 05	C-5 Azad Nagar, Bhilwara
9.	08-08-2014 (Three days)	Oyster	Entrepreneurs 06	Santpur, Aburoad, Sirohi

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
10.	19-08-2014 to 21-08-2014 (Three days)	Oyster	Entrepreneurs 20	Teh:- Kapasan, Distt:-Chittorgarh.121 North Sunderwas, Udaipur
11.	03-09-2014 (Three days)	Oyster	Entrepreneurs 10	C/O 39, Khanol colony, Udaipur
12.	11-09-2014 (Three days)	Oyster	Entrepreneurs 20	Village: Gangrar, Distt: Chittorgarh
13.	27-09-2014 (Three days)	Oyster	Farmer 40	KVK Pratapgarh, Distt: Pratapgarh
14.	09-10-2014 (Three days)	Oyster,	Entrepreneurs 20	84/273 Pratap Nagar, Jaipur
15.	15-11-2014 to 17-11-2014 (Three days)	Oyster	Entrepreneurs 35	Lambha, Gulabpura, Distt: Bhilwara,
16.	04-12-2014 to 06-12-2014 (Three days)	Oyster & Button	Farmer 20	Village: Mod ka,The: Asind, Bhilwara, V/P Nagdi, Distt; Pratapgarh
17	17-01-2015 (Three days)	Oyster	Farmer 5	A 26 Housing Board, Gulabpura, Distt: Bhilwara
18	11-02-2015 to 12-03-2015 (two days)	Oyster	Farmer 42	Gav-Jadu, Post- Samelpura, Distt. Chittorgarh, Vill: Acchapur, Teh: Sadulpur, Distt: Churu(Raj.)
19.	25-03-2015	Oyster, Button & Milky	30	FES Udaipur

Table 6.26. Off camous trainings

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1.	09-04-2014 (One day)	Oyster	Entrepreneurs 5	V/P Chirwa , girwa Udaipur
2.	13-05-2014 (One day)	Oyster	Farmers 2	Gopal Dwar road, Jataran (Pali)
3.	03-06-2014 (One days)	Oyster & Milky	Farmers 03	Ambamata, Bhattwadi, Udaipur
4.	06-02-2015 (One days)	Oyster	Farmer 15	31- Anjana Kesunda, Teh: Chotisadri, Dis. Pratapgarh. Pratap Nagar, old RTO Udaipur (Raj.)
	Total		25	

Table 6.27. Inter State Training

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1.	11-02-2015 (One day)	Oyster, Button & Milky	22	ATMA **Gujarat**
2.	18.2.2015 (One day)	Oyster, Button & Milky	25	ATMA **Nemach M.P.**
3.	27-02-2015 (One day)	Oyster, Button & Milky	89	Wilson College,Mumbai university
4.	21.11.2014 (One day)	Oyster, Button & Milky	25	SDAV, Gujarat
			Total:- 161	

Table 6.28. Awareness Camp

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1.	03-04-2014 (One day)	Oyster	Farmers 40	V&P Sapetia, Udaipur
2.	11-04-2014 (One Day)	Oyster	Farmers 44	334, Gandhinagar , Mallatalai Udaipur
3.	29-04-2014 (One Day)	Oyster	Farmers 35	H.No-7,Titardi, Udaipur (Raj.)
4.	01-05-14 to 03-05-2014 (three day)	Oyster	Farmers 80	H.M.Sec-5, Udaipur (Raj.)
5.	03-05-14 (One Day)	Oyster	Farmers 110	Manji ka gud, The; Badesar, Chittorgarh
6.	14-05-14 (One Day)	Oyster	Farmers 35	Teh. Ranivara, Jalore (Raj.)
7.	19-08-14 to 21-08-2014 (three days)	Oyster	Farmers 40	Village-Kanpur Teh:-girwa ,Udaipur (Raj.), Vill:Panehdevda, Distt:-Chittorgarh
8.	10-09-14 (One Day)	Oyster	Farmer 05	Jahajpur, Distt-Bhilwara
9.	17-09-14 (One Day)	Oyster	Farmer 25	P.Metwala, Banswara
10.	29-09-14 (One Day)	Oyster	Farmer 50	Jhan road, Shivpuri(M.P)
11.	14-10-14 (One Day)	Oyster	Farmer 50	The:Badisadri, Chittorgarh
12.	29-10-14 (One Day)	Oyster	Farmer 40	Teh: Chottisadri, Pratapgarh
13.	01-11-14 (One Day)	Oyster	Farmer 35	Kekri, Ajmer
14.	14-11-14 (One Day)	Oyster	Entrepreneurs 9	Village: kaladwas, Distt: Udaipur
15.	25.3.2015 (One Day)	Oyster	Entrepreneurs 20	FES, Udaipur.
16.	01-12-2014 (One Day)	Oyster	Entrepreneurs 25	Village: Roopniwas, Kekri
17.	12-12-2014 (One Day)	Oyster	Farmer 40	Sarana, Jalore
18.	03-01-2015 (One Day)	Oyster	Farmer 50	Udaipur
19.	18.2-2015 (One Day)	Oyster	40	ATMA.Tonk Rajasthan
			Total:- 773	

Involvement of women in training programmes: -125

Development of Mushroom museum:

A small mushroom museum is developed in AICRP having Five hundred twenty five wild mushroom flora and all cultivated mushrooms in dry as well as in wet form were preserved.

Supply of quality Mushroom Spawn: 500 Kg

Vellayani Centre

Table 6.29. Trainings conducted

Category	Date	No.of days	No. of participants
School children	19th to 21st May 2014	3	25
School children	22nd to 24th May 2014	3	25
Educated un employed youth	23rd to 24th July 2014	2	35
Educated un employed youth	28th to 29th October 2014	2	52
Educated un employed youth	30th to 31st January 2015	2	45

Fig. 6.11. Training for students

Fig. 6.12. Director SHM inaugurating the vacation class

Fig. 6.13. Trainees

Fig. 6.14. Chief guest distributing the certificates

Fig. 6.15. Trainees

Fig. 6.16. Trainees

Value addition in Shiitake and Button mushrooms

Fig. 6.17. Value added recipes of *Lentinus*

Fig. 6.18. Button mushroom rolls

Fig. 6.19. Button mushroom scramble

Ranchi Centre

ICAR-Research complex for Eastern Region, Research Centre, Ranchi is the premier spawn production centre of the Jharkhand. At this centre, demand of spawn by the farmers were observed throughout the year. But the maximum demand of Oyster mushroom were observed from the month of July to January and then after, milky and paddy straw mushroom spawns. Peoples of weaker section/ landless farmers actively engaged in the cultivation of mushroom, especially in Oyster, Milky and Paddy straw mushroom. When we see the monthly spawn production and sale during 2014-2015 (April, 2014-Jan., 2015), maximum demand of mushroom spawn was observed in the month of September, 2014 (595.2 Kg) followed by Nov.14 (537.2 kg) and Aug.,14 (452.4 kg). In 2014-2015, total spawn production (3137.6Kg) was observed at Ranchi Centre and 3.14 Lakhs revenue generated by the selling of mushroom spawn (Fig 4.1-4.3). When we see the yearly spawn production, maximum spawn production was observed in the year, 2012-2013 (5494.5 Kg) followed by Year, 2013-2014 (5358.9 Kg). During, 2014-2015 the spawn production (3137.6 Kg) was observed relatively quite low as compared to previous two years. However, in revenue generation, maximum revenue generated in the year 2012-2013 (4.12 Lakhs) followed by year 2013-2014 (4.01 Lakhs), 2014-2015 (3.13 Lakhs) Moreover, in summer season, especially from the month of April-June, farmers demanded spawn of Milky mushrooms and during these months the sales of oyster spawn are quite low due to high temperature.

Visitors

Mushroom growers turned up for seeing technology demonstration and purchasing of mushroom spawns during the year, 2014-2015.

Table 6.30. Demonstration of Mushroom production trainings organized at Ranchi Centre

Months	Visitors
March, 2014	25 (16 female)
April, 2014	29 (15 female)
May, 2014	23 (19 female)
June, 2014	22 (17 female)
July2014	65 (48 female)
August, 2014	79 (39 female)
September, 2014	82 (47 female)
October, 2014	65 (49 female)
November, 2014	86 (56 female)
December, 2014	71(41 female)
January, 2015	70 (38 female)
February, 2015	63 (30 female)

Television Talk

- Jharkhand mein Mushroom ki Kheti
- Jharkhand mein Oyster mushroom ki Kheti

Table. 6.30. Mushroom Production Trainings organized by Ranchi Centre

S. No.	Trainings on	Dated	No of Beneficiaries
1	Training on *Dendrobium*, Mushroom and Protected cultivation of Vegetables crops	08-10 August, 2014	25
2	Training on *Dendrobium*, Mushroom and Protected cultivation of Vegetables crops	16-18 August, 2014	24

Coimbatore Centre

Table 6.31. Mushroom Training Programmes Organized at Coimbatore Centre

Trainings	One day training		Five day training		Special Training		Spawn Sold		Visitors
	No.	Persons	No.	Persons	No.	Persons	No. of bags	Qty. (kg)	
April 14	1	63					3940	1182	92
May 14	1	67					180	54	75
June 14	1	35	1	13			437	131	117
July 14	1	62					303	91	24
August 14	2	179					132	40	56
September 14	1	138			*1	54	250	75	131
0ctober 14	1	60	1	9			410	123	279
November 14	1	116					284	85	117
December 14	1	153					708	212	133
January 15	2	118					371	113	177
February 15	1	108			**1	19	4054	1216	127
March 15	1	71	1	7			169	51	
TOTAL	**14**	**1170**	**3**	**29**	**2**	**73**		**2413**	**1328**

Table 6.31. Gender wise Participation in Mushroom Training Programmes

S.No	One day Training No. & Date	No. of Participants		
		Men	Women	Total
1.	371 / 07.04.14	43	20	63
2.	372 / 05.05.14	55	12	67
3.	373 / 05.06.14	28	7	35
4.	374 / 07.07.14	46	16	62
5.	375 / 05.08.14	104	29	133
6.	376 / 28.08.14 Special Trg.	35	11	46
7.	377 / 05.09.14	91	47	138
8.	378 / 07.10.14	47	13	60
9.	379 / 05.11.14	84	32	116
10.	380 / 05.12.14	114	39	153
11.	381 / 05.01.15	83	20	103
12.	382 / 22.01.15 Special Trg.	-	15	15
13.	383/ 05.02.15	82	26	108
14.	384 / 05.03.15	55	16	71
	Total	**867**	**303**	**1170**

Table 6.31. Five days Mushroom Training Programmes

S.No	Five day Training No. & Date	No. of Participants		
		Men	Women	Total
1.	43 / 23.06.14 to 27.06.14	10	3	13
2.	44 / 13.10.14 to 17.10.14	7	2	9
3.	45 / 09.03.15 to 13.03.15	5	2	7
	Total	**22**	**7**	**29**

Table 6.32. Short Demo. / Training Classes to School / College Students (Apr.14 to Mar.15)

S.No	Date	Name of the school / College	No. of participants		
			Staff	Students	Total
1.	06.06.14	Diploma (Agri.) Students ARS, Kovilpatti	1	45	46
2.	12.06.14	Diploma (Agri.) Students CSIA, Thindivanam	1	48	49
3.	05.07.14	B.F.Tech Students Directorate of ODL, TNAU	1	23	24
4.	10.09.14	Pasumpon Muthuramalingathevar College, Madurai	1	55	56
5.	17.10.14	Vocational Agri. Students - Govt. Boys School, Orathanadu, Thnajavur Dt.	1	28	29
6.	21.11.14	Sri Kumaran Public School, Chengapalli, Tirupur Dt.	1	34	35
7.	25.11.14	SPB Mat.Hr. Sec. School, Erode	1	49	50
8.	28.11.14	GTV Hr. Sec. School, Pudur, Attapady, Kerala	1	31	32
9.	09.12.14	Vivegam Hr. Sec. School, Dharapuram, Tirupur	5	66	71
10.	09.12.14	Avatar Public School, Chettipalayam, Coimbatore	1	10	11
11.	19.12.14	BSc.,(Ag.) Hons. Students of School of Agrl. Sci., & Rural Development, Medziphema Campus, Nagaland University, Nagland	3	60	63
12.	24.12.14	Sri Krishna Polytechnic College, Kovai Pudur, CBE.	1	52	53
13.	29.12.14	Corp.Govt. Hr. Sec. School, R.S.Puram, Coimbatore	1	21	22
14.	29.12.14	Corp.Govt. Hr. Sec. School, Selvapuram, Coimbatore	1	23	24
15.	22.01.15	Gedee Public School, Eachanari, Coimbatore	8	120	128
16.	22.01.15	Thirupur Kumaran College for Women, Thirupur	2	47	49
17.	11.02.15	Diploma (Agri.) Students ARS, Kovilpatti	2	47	49
18.	12.02.15	Gedee Public School, Eachanari, Coimbatore	7	67	74
		Total			

Table 6.33. Special Training Classes to Self Help Groups / Farmer groups

S.No	Date	Name of the Organization	Staff	Trainees	Total
1.	19.06.14	BTM (ATMA) Farmers from Sivagangai	1	21	22
2.	23.09.14	ATMA Farmers from Thalavadi Block	1	20	21
3.	08.10.14	SHG from Integrated Watershed Management Programme, DWDA, Kottampatti, Madurai I batch	1	49	50
4.	13.10.14	SHG from Integrated Watershed Management Programme, DWDA, Kottampatti, Madurai II batch	1	49	50
5.	17.10.14	Trainees from Dist. Instt. of Education and Training, Keelapalur, Ariyalur	1	99	100
6.	17.10.14	Sri Mariamman Kuzhu, SHG members from Sedapatti Block, Madurai	1	49	50

Media Focus

Fig. 6.20. Mushroom in Media in Tamilnadu

Outreach Programme

1. AGRIINTEX - 2014 at CODDISSIA Trade Fair Complex, Coimbatore - Outdoor Mushroom Pavilion was visited by more than 2.00 lakh people. Date: 18-21st July 2014.

Fig. 6.21. Agriintex - 2014 at Coddissia Trade Fair Complex, Coimbatore, Out Door Mushroom Pavilion Date: 18-21st July 2014 was visited by more than 2.00 lakh people

2. HORTIINTEX - 2014 at CODDISSIA Trade Fair Complex, Coimbatore – Outdoor Mushroom Pavilion was visited by more than 60,000 people. Date: 07-09th Nov. 2014.

Fig. 6.22. Hortiintex - 2014 At Coddissia Trade Fair Complex, Coimbatore, Out Door Mushroom Pavilion; Date: 07-09th November 2014 was visited by more than 60,000 people

3. Southern Agricultural Regional Meet and Trade Fair 2015 held at TNAU, Coimbatore – Mushroom production technology exhibits have been witnessed by more than 2000 farmers and public from South Inida. Date: 7-9th Jan. 2015.

4. Milky mushroom exhibits sent for display during Annual Pusa Krishi Vigyan Mela at IARI, New Delh. Date: 10-12th Mar. 2015.

Teaching and Outreach Programmes

- One **ODL Course** on Mushroom Cultivation was conducted from 31.01.2015 to 27.06.2015 through the Directorate of Open Distance Learning, TNAU, Coimbatore. A total number of 12 students have registered for the course.

- UG – IV year BSc.,(Agri.) students were taught PAT 451 . Experiential Learning in Mushroom Production Technology 0+5 Course during VIII Semester 2014-15.

- PG – One MSc., (Ag.) Plant Pathology student has completed his work on the **"**Exploration of bioactive compounds of *Pisolithus tinctorius* against soil borne plant pathogens**".**

- One Ph.D Student is currently working on the **"**Exploration of Bioactive Molecules of Chinese caterpillar fungus *Ophiocardyceps sinensis***".**

- One Ph.D student is working on **"**Developing Innovative Systems and Modules for Oyster ushroom production**"**

Participation in the National / International Conferences

1. Participated and presented an invited paper in the 8th Int. Conf. on Mushroom Biology and Mushroom Products organized by World Society of Mushroom Biology and Mushroom Products, ICAR-DMR and Mushroom Society of India between 19-22 Nov.2014, NASC Complex, Pusa, New Delhi.

2. Participated in the XXIII National Conference on "Recent Trends in Virology Research in the Omics Era" jointly organized by Indian Virological Society and Tamil Nadu Agricultural University between 18-20, 2014 at TNAU, Coimbatore.

3. Participated and presented a lead paper in 36th Ann. Conference and National Symposium on "Challenges and management Approaches for the Crop Diseases of National Importance- Status and Prospects" organized by Indian Society of Mycology and Plant Pathology and Tamil Nadu Agricultural University between 12-14th Feb.2015 at AC& RI, Madurai.

Pantnagar Centre

Table 6.34. Training on mushroom cultivation

Particular	Number
Training	**19**
Beneficiaries	**585**
Male	360
Female	225
General	293
SC/ST	292

Fig. 6.23. Training at Kalsi block, Dehradun

Fig. 6.24. Training at MRTC Pantnagar Centre

Fig. 6.25. Training at Chakrata block, Dehradun

Fig. 6.26. Training at MRTC Pantnagar Centre

Kisan Mela

485 no. of farmers were visited the centre during Kisan Mela w.e.f. **Oct 05-08, 2014** and 234 no. of farmers during Kisan mela w.e.f. **March 13-16, 2015**. They were informed the mushroom production technology. They were also experienced by looking the standing crops of mushrooms at the centre. During Kisan Mela Gosthi is organized daily 3.00 – 6.00pm and the scientist answered their queries.

Mushroom Museum

Mushroom M-useum has already been developed at the centre and is being updated time to time

Workshop

- National workshop on Retrospective and Prospective Analysis of Indian Agriculture: The Roadmap Ahead w.e.f. Nov. 17-18, 2014 organized by Directorate of Experiment Station, GBPUA&T, Pantnagar
- 8th International conference on Mushroom Biology and Mushroom Products w.e.f. Nov. 19-22. 2014, New Delhi organized by World Society of Mushroom Biology and Mushroom Products ICAR-Directorate of Mushroom Research, Solan Mushroom Society of India, Solan.
- National Conference on Science of Imics for agricultural productivity: future perspectives w.e.f. March 04-6, 2014organized by Deptt. of Molecular biology and genetic Engineering, college of Basic Science and Humanities, GBPUA&T Pantnagar under the Aegis of Society of Plant Biochemistry & Biotechnology, New Delhi
- XVI Annual Workshop of All India Coordinated Research Project on Mushroom is being organized at RAU, Pusa, Samastipur (Bihar) on March 20-21, 2014.

Table 6.35. Cultures, master spawn, comm. Spawn, fresh mushroom and compost casing Supply (2014-15)

Comm. Spawn (Kg)			Master spawn (No.)			Cultures tube (No.)			Compost	Casing soil
Button	Oyster	milky	Button	Oyster	milky	Button	Oyster	milky	(Ton)	(Qtl)
333	601	134	11	03	04	06	07	15	18.48	36
	1068 kg			**18 No. bottle**			**28 No. tube**			

Ludhiana Centre

Table 6.36. Trainings, Lectures/Demonstrations, visits, seminar/workshop, TV/Radio Talk/News Column conducted at Ludhiana Centre

Date	Venue	No. of participants
Training Courses		
14-15.05.14	Training course on cultivation and processing of tropical mushrooms, PAU, Ludhiana	35
03-04.06.14	Mushroom training course for Horticulture Supervisor Trainees, PAU, Ludhiana.	23
08-12.09.14	Mushroom training course for rural farmers, PAU, Ludhiana.	48
06-10.10.14	Entrepreneurship development program on mushroom cultivation under IWMP, PAMETI, Ludhiana	20
13-17.10.14	Mushroom training course for rural farmers, PAU, Ludhiana.	47
03-04.09.14	Mushroom training course for HDO's on integrated mushroom unit, PAU, Ludhiana.	17
07.11.14	Mushroom training course for rural farm ladies, KVK, Bahowal.	12
24-28.11.14	Entrepreneurship development program on mushroom cultivation under IWMP, PAMETI, Ludhiana	25
02-03.12.14	Orientation to mushroom growing for farm workers, PAU, Ludhiana.	26
24-28.12.14	Entrepreneurship development program on mushroom cultivation under IWMP, PAMETI, Ludhiana	32
Lectures/Demonstrations at Kisan Melas/Exhibitions		
06.5.14	Mushroom production and processing in training on chotte paddhar te udyog sthapit karan bare, CoAE, PAU, Ludhiana.	
22-23.05.14	Research and extension specialist workshop on vegetable, floriculture, sericulture, post harvest management, FPM, FT and Agril economics, PAU, Ludhiana	
08.9.14	Regional Kisan Mela at KVK, Amritsar	
10.09.14	Regional Kisan Mela at Ballowal	
12-13.09.14	Kisan Mela at PAU, Ludhiana	
16.09.14	Regional Kisan Mela at Rauni	
18.09.14	Regional Kisan Mela at Faridkot	
23.09.14	Regional Kisan Mela at Gurdaspur	
27.09.14	Regional Kisan Mela at Bathinda	
21-23.11.14	India International Trade Fair (14-27 Nov.), N. Delhi	
18.01.15	Exhibition at NRI Sangat Darshan by Punjab CM at whistling woods, Ferozepur road, Ludhiana	

Date	Venue	No. of participants
22-23.01.15	Research and extension specialist workshop on fruits, mushroom, agroforestry with post harvest management, FPM, FT and Agroeconomics, PAU, Ludhiana	
23.02.15	Mushroom Production in Training course on judicious use of resources for crop development, PAU, Ludhiana	
10.03.15	Regional Kisan Mela at Ballowal	
12.03.15	Regional Kisan Mela at KVK, Amritsar	
12.03.15	Regional Kisan Mela at Faridkot	
16.03.15	Regional Kisan Mela at Rauni	
20-21.03.15	Kisan Mela at PAU, Ludhiana	
25.03.15	Regional Kisan Mela at Gurdaspur	
27.03.15	Regional Kisan Mela at Bathinda	
28.03.15	Outreach program on Food Processing, Mann, Sri Mukatsar Sahib	
Visits		
29.04.14	Visit of Mushroom Research Center, PAU by students and faculty of College of Agriculture, Lalsot, Dause Sri KN Agri. Univ., Jobner	26B, 11G, 2 faculty
29.05.14	Visit of Mushroom Research Center, PAU by students and faculty of College of Agriculture, ANG Ranga Agril Univ., Angaru, Hyderabad	50
04.07.14	Visit of Mushroom Research Center, PAU by Team from Agroprocessing Enterpreneurship Development Centre, Chandigarh	24
28.08.14	Visit of Mushroom Research Center, PAU by farmers from KVK, Faridkot	30
29.08.14	Visit of Mushroom Research Center, PAU by farmers from KVK, Kheri	16
18.09-14	Visit of Mushroom Research Center, PAU by farmers from Chhatisgarh	60
23.09.14	Visit of Mushroom Research Center, PAU by students and faculty from Agri. College, Raichur, KA	28G,47B,4 faculty
29.09.14	Visit of Mushroom Research Center, PAU by Mushroom trainees from KVK, Nurmahal	16
01.10.14	Visit of Mushroom Research Center, PAU by Mushroom trainees from KVK, Kheri	15
06.10-14	Visit of Mushroom Research Center, PAU by farmers from Chhatisgarh	40
10.10.14	Visit of Mushroom Research Center, PAU by students fromTR Institute of Agri. And Rural Development, Parambalur, TN	52G,29B,3faculty
15.10.14	Visit of Mushroom Research Center, PAU by students from Uttar Banga WB Krishi Vishavidyalaya, Oochbihar,	5G,36B,2faculty
17.11.14	Visit of Mushroom Research Center, PAU by students from College of Horticulture, Univ. of Agr. And Hort Sci, Shimoga, KA	29G,9B,2faculty
10.12.14	Visit of Mushroom Research Center, PAU by students from College of Sericulture, Chintamani, UAS, Bangalore, KA	39G,25B,6 faculty
10.12.14	Visit of Mushroom Research Center, PAU by farmers from Bihar	20
11.12.14	Visit of Mushroom Research Center, PAU by students from College of Agriculture, UAS, Bangalore, KA	27G,17B,3 faculty
16.12.14	Visit of Mushroom Research Center, PAU by Mushroom trainees from KVK, Mukatsar	21

Date	Venue	No. of participants
20.02.15	Visit of Mushroom Research Center, PAU by farmers from Gujrat	25
24.02.15	Visit of Mushroom Research Center, PAU by farmers from Chattisgarh	20
03.03.15	Visit of Mushroom Research Center, PAU by students and faculty of Layallpur Khalsa College, Jalandhar	52
05.03.15	Visit of Mushroom Research Center, PAU by SC/ST Mushroom trainees from village Mohi, Ludhiana	40
09.03.15	Visit of Mushroom Research Center, PAU by students and faculty of College of Horticulture, Myrurum, UHS, Bagalkot	22B, 18G, 3 faculty
18.03.15	Visit of Mushroom Research Center, PAU by students and faculty of College of Agriculture, JNKVV, Rewa	12G,3 faculty
Seminar/Workshop		
22-23.05.14	Research and extension specialist workshop on vegetable, floriculture, sericulture, post harvest management, FPM, FT and Agril economics, PAU, Ludhiana	
19-22.11.14	8th International Conference on Mushroom Biology and Mushroom Products, NASC, N. Delhi	
22-23.01.15	Research and extension specialist workshop on fruits, mushroom, agroforestry with post harvest management, FPM, FT and Agroeconomics, PAU, Ludhiana	
TV/Radio Talk/News Column		
23.05.14	Khumban di kasht, DDK, Jalandhar	
29.05.14	Stop burning wheat, paddy straw, use them to grow mushrooms, HT Ludhiana	
04.06.14	Mushroom Production in Kheti Khoj, AIR FM Gold, Ludhiana	
07.10.14	Khumban di kasht, DDK, Jalandhar	

Spawn supply

During the year 2014-15, 920 kg mushroom spawn of *Agaricus bisporus, Calocybe indica, Pleurotus* spp. and *Volvariella volvacea* was supplied to the mushroom growers of Punjab.

Pasighat Centre

Seven mushroom cultivation training programmes and three spawn production training was conducted during the 2014-15 year. Approximately two hundred people were trained in mushroom production technology. Four skilled spawn production training and consultancy for DPR preparation was given separately to be the skilled persons. Consequently, nine local male people and seventeen female were adopting the technology for cultivation of Oyster mushroom at various places of Arunachal Pradesh. Mushroom production technology was exhibited during North East Agri Fair and also conducted a one mega event Programme MUSHROOM DAY of College of Horticulture and Forestry Pasighat on 13-16 November, 2014 and Foundation day of ICAR RC Umiam, Barapani (Meghalaya). Eighteen students of B.Sc. (Hort.) Final Year were also trained for spawn and cultivation of oyster mushroom under the experiential learning programme: Mushroom cultivation. Spawn production was increased over period of time. It was about 250 kg sold to the growers and 2 mother spawn bags are sold during December, 2014. One hundred thirty five kg of fresh mushrooms are sold from our unit. Monthly visited the progressive Mr. Taimur Jamoh. Mrs. Oti Sitang, Mr. Gekong Pertin, Mr. Talem Mize and Mrs. Osing Taboh production unit at Ruksin block. Recently, two mushroom houses constructed one is low cost and other one is GSI sheet sheet.

7. PUBLICATIONS

Bhubaneshwar Centre

Debata, D.K., Biswas, M.K. and Mohapatra, K.B.2014. Management of competitor fungi in paddy straw mushroom (*Volvariella volvacea*) beds. *Journal of Plant protection and Environment.* 11(1):98-102.

Mohapatra, K.B., Chinara, N. and Bhanja, P.K. 2014. Status of Mushroom production in Odisha. (In): Souvenir on Production of mushroom under protected condition, 25, July, 2014. AICRP on Mushroom, OUAT, Bhubaneswar: pp.4-7.

Mohapatra, K.B., and Chinara, N. 2014. Recent advances in spawn production technology. (In): Souvenir on Production of mushroom under protected condition, 25, July, 2014. AICRP on Mushroom, OUAT, Bhubaneswar: pp.8-11.

Mohapatra, K.B. and Dora, D.K. 2014. Protected cultivation of Mushroom: the subject deserves concern. (In): Souvenir on Production of mushroom under protected condition, 25, July, 2014. AICRP on Mushroom, OUAT, Bhubaneswar: pp.12-15.

Mohapatra, K.B., Dora, D.K and Chinara, N. 2014. Post harvest management of Mushroom: the need of the day. (In): Souvenir on Production of mushroom under protected condition, 25, July, 2014. AICRP on Mushroom, OUAT, Bhubaneswar: pp.23-27.

Debata, D.K., Mohapatra, K.B., Ranasingh, N. and Behera, B.C.2014. Alternate substrates for assessing the bio-efficiency of paddy straw mushroom (*Volvariella volvacea*). Indian Journal of Crop Ecology **2**(2):27-28.

Sahoo, A.K., Mohapatra, K.B., Behera, B., Jadhao, K.R and Rout, G.R. 2014. Phylogenetic analysis of high yielding strain of paddy straw mushroom (*Volvariella volvacea*) by using ISSR marker. *Middle-East Journal of Scientific Research* **21**(8):1197-1202.

Mohapatra, K.B. and Rout, M.K. 2014. Effect of substrate soaking period and bed dimension on productivity of straw mushroom, *Volvariella volvacea*. *Journal of Mycopathological Research* **52**(2):355-358.

Mohapatra, K.B. and Chinara, N. 2014. Prospects of paddy straw mushroom (Volvariella *volvacea*) grown as an intercrop in coconut plantations of coastal Odisha. Extended summaries of National Symposium on “Management options for enhancing farm productivity and livelihood security under changing climate”, October 29-31, 2014, Odisha chapter, Indian Society of Agronomy, OUAT, Bhubaneswar. Pp.97-99.

Debata, D.K., Mohapatra, K.B. and Chinara N. 2014. Yield performance of straw mushroom on different substrates. Extended summaries of National symposium on “Management options for enhancing farm productivity and livelihood security under changing climate”, October 29-31, 2014, Odisha chapter, Indian society of Agronomy, OUAT, Bhubaneswar. Pp.47-149.

Mohanty, S., Nayak, N. and Mohapatra, K.B. 2014. *In vitro* evaluation of fungi toxicants against leaf spot of Gerbera caused by *Colletotrichum capsici* (Butler and Bisby). Journal of Plant Protection and Environment **11**(2): 71-73.

Mohanty, S., Nayak, N. and Mohapatra, K.B. 2014. Bioefficacy of different phytoextracts and natural oils against Colletotrichum leaf spot of Gerbera (*Gerbera jamesonii*). Journal of Plant Protection and Environment **11**(2): 74-78.

Mohapatra, K.B. and Chinara, N.2014. Indigenous edible mushroom flora of Odisha. (In) Indigenous agricultural practices, farmer's recent innovations and low cost technologies of Odisha , Department of Agronomy, OUAT, Bhubaneswar, India, Section IV, pp.214-221.

Chinara, N. and Mohapatra, K.B. 2014. Indigenous technical knowledge in plant disease management (In) Indigenous agricultural practices, farmer's recent innovations and low cost technologies of Odisha , Department of Agronomy, OUAT, Bhubaneswar, India, Section I, pp.261-263.

Mohapatra, K.B., Dora, D.K., Chinara, N., Sahu, G.S. and Dwivedi, S. 2014.Growing Mushroom under Protected Condition: A Lucrative Venture. Presented at the 6th Indian Horticulture Congress held at TNAU, Coimbatore from November 6-9, 2014.

Mohapatra, K.B.2014. Production of Paddy straw mushroom in bamboo poly house. (In) Training manual on Bamboo poly house. NCPAH, Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India, New Delhi and PFDC, OUAT, Bhubaneswar, India, pp. 18-22.

Ahlawat, O.P., Mohapatra, K.B., Kaur, H. and Singh, M. 2014. Genetic variability in strain of *Volvariella volvacea* collected from the state of Odisha, India. Proceedings of the 8th International Conference on Mushroom Biology and Mushroom Products (ICMBMP8). Directorate of Mushroom Research, Solan (HP), India, pp.135-144.

Mohapatra, K.B. and Chinara, N 2014. Performance of straw mushroom (*Volvariella volvacea*) raised as intercrop in coconut plantations of costal Odisha. Proceedings of the 8th International Conference on Mushroom Biology and Mushroom Products (ICMBMP8). Directorate of Mushroom Research, Solan (HP), India, pp.314-317.

Chinara, N and Mohapatra, K.B. 2014. Prevalence of competitor moulds and diseases in straw mushroom (*Volvariella volvacea*) beds and their management. Proceedings of the 8th International Conference on Mushroom Biology and Mushroom Products (ICMBMP8). Directorate of Mushroom Research, Solan (HP), India, pp.563-566.

Debata, D.K., Mohapatra, K.B. and Ranasingh, N. and Tudu, B.K. 2015. Evaluation of cultivation methods of paddy straw mushroom (*Volvariella volvacea*). Journal of Plant Disease Sciences. **10**(1). (Accepted for publication).

Rout, M.K., Mohapatra, K.B., Ray, A. And Mohanty, L.K. 2015.Studies on growth and yield of two important species of *Pleurotus* with different pasteurization methods. Proceedings of the Fourth International Conference on "Management of sustainable livelihood systems".14-17 February, 2015, OUAT, Bhubaneswar, Odisha, India, pp.77-78.

Chinara, N., Mohapatra, K.B., Pattnaik, R.K., Sethy, P. and Das, K.C.2015. Evaluation of hybrid rice variety for popularization among the small farmers in Kalahandi district of Odisha. Proceedings of the Fourth International Conference on "Management of sustainable livelihood systems".14-17 February, 2015, OUAT, Bhubaneswar, Odisha, India,pp.85-86.

Chinara, N., Mohanty, S. and Mohapatra, K.B.2015. Paddy straw mushroom cultivation in low cost bamboo based poly house during the winter season: A profitable venture. Proceedings of the Fourth International

Conference on “Management of sustainable livelihood systems”.14-17 February, 2015, OUAT, Bhubaneswar, Odisha, India, pp.139.

Popular articles

Mohapatra, K.B. and Chinara N. 2014. Mushroom cultivation in Odisha: Challenges and opportunities. Diamond Jubilee Souvenir, College of Agriculture, OUAT, Bhubaneswar. Pp.139-142.

Mohapatra, K.B. and Chinara N. 2014. Mushroom cultivation in Odisha: A bird’s eye view. Chasir Sansar 49(2):23-26.

Mohapatra, K.B. and Chinara N. 2014.Post harvest care of Paddy straw mushroom. Krishak Bandhu Annapurna XXII(7):13-14.

Mohapatra, K.B., Chinara N. and Rout, M.K. 2015. Protected cultivation of mushroom: The need of the hour. Souvenir of 53rd Commemoration day of College of Agriculture, OUAT, Bhubaneswar. Pp86-90.

Mohapatra, K.B. 2014. The Eighth International conference on Mushroom biology and mushroom products at a glance. Krishak Bandhu Annapurna XXII(12):29-30.

Mohapatra, K.B. 2015. Role of mushroom cultivation on the economic development of farmers. Krushak Adhikar, January 2015.

Theses (Ph.D)

D. Debata.2014. Evaluation of substrate and growing techniques for improvement of biological efficiency of paddy straw mushroom (Volvariella volvacea) in Odisha.

K. Sahoo. 2015. Studies on improvement of biological efficiency of straw mushroom (Volvariella spp.) in Odisha.

Pune Centre

Shinde, D.B., V.K. Bhalerao, A.C. Jadhav and A.M. Tirmali,2014. Effect of sulphur oxidizing microorganisms with sulphur on available nutrients in green gram (*Vigna radiate* L.) J. Agric. Res. Technology : 415-19.

Jadhav, A.C., D.B. Shinde, S.B. Nadre and D.S. Deore. 2014. Quality improvement of casing material and yield in milky mushroom (*Calocybe indica*) by using biofertilizers and different substrates. Proceedings of 8th International Conference on Mushroom Biology and Mushroom Products (ICMBMP) held at NASC Complex, New Delhi during 19-22 Nov, 2014. : 359-364.

Shinde, D.B., A.C. Jadhav and N.G. Desai. 2014. *Dhingri alimbi lagwad va kadhani paschyat tantradnyan.* AGRO-OWN.

Jadhav A.C. and Shinde, D.B. 2014. *Dhingri alimbiche mahatva Shetkari.* Nov, 2014, pp: 30-31.

Faizabad Centre

Kumar, P, Maurya, A. K. And Kumar, Sanjeev 2014. Evaluation of substrates and supplements for enhancing the productivity of paddy straw mushroom (*Volvariella volvacea*). Prasented in 8th International

Conference on Mushroom Biology and Mushroom Products, organised by World Society for Mushroom Biology and Mushroom Products, Directorate of Mushroom Research, Solan and Mushroom Society of India, at New Delhi from 19-22 November, 2014. (Abstract-V-P-21, p.78)

Kumar, Pradip, Awasthi, L.P. and Singh, S.P. 2014.Performance of commercial cucumber cultivars against viral diseases under natural field conditions. *International Journal of Plant Protection* **7:**238-239

Chaubey, N., Awasthi, L.P., Singh S. P. and Kumar, Pradip 2014. Evaluation of potato genotypes/germplasm against viral disease(s) under field conditions. *Trends in Biosciences* (Accepted)

Amit Kumar Maurya M.Sc. (Ag.) Plant Pathology I.d.No.: A-6881/12, submitted his thesis on "Studies on Substrates for enhancing the productivity of Paddy Straw Mushroom (*Volvariella volvacea*).

Raipur Centre

Awadhiya, G. K 2014.Evaluation of various substrates and supplements for enhancing yield of *Pleurotus eous* (Berk.)Sacc International conference on Mushroom Biology and Mushroom Product. Held at New Delhi

Awadhiya, G. K 2014. Diversity of edible mushroom flora in Chhattisgarh.National symposium on Plant Pathology in Genomic Era May 26-28 Held at IGKV Raipur (CG).

Mansuri M. A., Awadhiya, G. K 2014. Influence of suppliments on growth and yield of Pleurotus ostreatus (Jacq. Ex Fr.)P. Kummer..National symposium on Plant Pathology in Genomic Era May 26-28 Held at IGKV Raipur (CG).

Mansuri M. A., Awadhiya, G. K 2014. Role of temperature and pH on mycelia characters of *Pleurotus ostreatus* (Jacq. Ex Fr.) P. Kummer. National symposium on Plant Pathology in Genomic Era May 26-28 Held at IGKV Raipur (CG).

Sahu, S. K. , Awadhiya G. K; Tiwari Surykant; Joshi B. K and Thakur R. 2014. Evaluation of different wave length (colour of light) on radial growth of Pleurotus eous (Pink oyster mushroom). National symposium on Plant Pathology in Genomic Era May 26-28 Held at IGKV Raipur (CG).

Awadhiya G. K., Chandrawanshi S.S; Thakur M. P; and Toore N. 2014. White button mushroom production technology.*National mothly Krishi World*. Nov. 33-35.

Awadhiya G. K., Chandrawanshi S.S; Thakur M. P; and Toore N. 2014. Mushroom spawn (Beej) production technology.*National mothly Krishi World*. Oct. 21.

Sahu Santosh K & Awadhiya G.K 2014. Evaluation of different substrates against pink oyster mushroom *Pleurotus eous* for their yield and it attributing characters. Poster presentation in National symposium on Medicinal and aromatic plant held at IGKV Raipur in month of Jan 2014

Awadhiya G. K.2014. Mushroom se banega sugar free puastic bread Haribhoomi 23April 2014

Awadhiya G. K. 2014. Rojgar ka Madhyam Mushroom Utpadan Patrika 29 sep 2014

Awadhiya G. K. 2014. Balti me Ugaeye mushroom April 03. 2014

Awadhiya G. K.2014. Protien se bharpur sugar free mushroom bread. Navbhaarat 21.05. 2014

Dhand Vivek. 2014. Mushroom Untpadan aur jaivik kheti par hoga fokas- Chief Sec. Govt of CG. Nai Dunia 12.08.2014

Nauni Centre

Gupta Dharmesh,Chauhan Praneet,Suman BC and Thakur Manisha. 2014. Effect of different solid and liquid culture media on the growth of pink oyster mushroom (*Pleurotus djamor* var. *roseus*). *Ind.J.Mushrooms*. 32(1):18-21.

Chauhan Praneet ,Gupta Dharmesh, ,Suman BC and Thakur Manisha. 2014.Effect of different spawn rates on yield of Pink oyster mushroom, *Pleurotus djamor* var. *roseus*. *Ind.J.Mushrooms*. 32(1):1-3.

Kumar Vijay, Suman BC and Gupta Dharmesh.2014. Evaluation of various strains of *Agaricus bisporus*(Lange) Imbach for their production efficiency and other morphological characteristics. *Ind.J.Mushrooms*. 32(1):28-35.

Suman BC and Dharmesh Gupta.2014. Conservation of mushroom cultures-a review. *Ind.J.Mushrooms*. 32(1):15-17.

Mehta Sheetal, Savita Jandaik & Dharmesh Gupta. Effect of Cost-Effective Substrates on Growth Cycle and Yield of Lingzhi or Reishi Medicinal Mushroom*, Ganoderma lucidum* (Higher Basidiomycetes) from Northwestern Himalaya (India). *International Journal of Medicinal Mushrooms,* 16(6): 585–591 (2014)

Verma Shalini, Sharma I.M., Gupta Dharmesh and Sharma N.C. 2013. Fungicidal management of powdery mildew of apple. *Journal of Mycology and Plant Pathology* 43(1):138-139.

Bulletins published

Gupta Dharmesh,Suman BC and Manju Sharma.2014.A technical bulletin on Aushdhiya mushroom ki kheti. 24 p.Published under horticulture technology mission(Mini-mission-HP)

Research Papers presented in International Conference

Gupta Dharmesh, Jarial RS and Manju Sharma.2014. Some interventions in the cultivation technology of important medicinal mushrooms.p.111. In: international conference on mushroom biology and mushroom products at NASC complex, New Delhi w.e.f 19-22 Nov. 2014.

Barapani Centre

Baiswar P, Chandra S and SV Ngachan. 2014. Characterization of fungal parasites and competitor moulds of mushrooms using Scanning electron microscopy and molecular tools in Northeast India. *Environment and Ecology* 32(4B):1714-1716.

Nongkynrih B, Firake DM, Baiswar P, Behere GT, Chandra S and N. S. Azad Thakur. 2015. Bamboo-leaf Prickly ash extract: A potential bio-pesticide against two major pests of oyster mushroom. pp. 66. **In**: Symposium on Holistic plant health management in organic agriculture. February 10-11, 2015 at ICAR Research Complex for NEH Region, Umiam, Meghlaya, India.

Firake DM, Nongkynrih B, Baiswar P, Behere GT, Patra S, Chandra S and N.S. Azad Thakur. 2015. Pest complex of cultivated oyster mushroom and their population dynamics in Meghalaya. pp. 66. **In**:

Symposium on Holistic plant health management in organic agriculture. February 10-11, 2015 at ICAR Research Complex for NEH Region, Umiam, Meghlaya, India.

Pusa Centre

Popular Articles

Dayaram and Pradita Kumari 2015. Mushroom utpadan ek krishi vyavsay. Adhunik Kisan.

Participation in Seminar/Symposia/Lecture delivered

Participated in 73nd Kharif research council meeting from June 14th-15th 2014 and presented the AICRP mushroom research highlights.

News paper clipping : 75

Awards/Recognition

Smt. Marnoma Singh mushroom growers from Lalganj, Vaishali district was awarded **"Abhinav Kisan Puraskar**" on 26.01.2015 by RAU Pusa

Udaipur Centre

Pramod Borkar, Anila Doshi, Makarand Joshi and Sudhir Navathe2014.Suitability of Various substrates for Cultivation of Pleurotus Pulmonarius in Konkan Region of Maharashtra. Journal of Life Science Research Vol. 1No. 2,51-53, September 2014.

Pramod Borkar, Anila Doshi, Sudhir Navathe 2014. Termitomyces of Konkan, India. Indian Journal of Science, 11(30),82-89.

Pramod Borkar, Anila Doshi**,** Makrarand Joshi, Sudhir Navathe 2014. Agarics of Konkan, India, Indian Journal of Science, 11(29), 58-65.

Birendra Kumar Mehta, Sanjay Kumar Jain, Gyanendra Prakash Sharma, Anila Doshi, and H K Jain,2015, Optimization of Osmotic Drying Parameters for Button Mushroom (*Agaricus bisporus*)-Part I, Mushroom Research Vol(25) in press

B K Mehta, S K Jain*, G P Sharma, Anila Doshi, and H K Jain,2015, Osmotic Dehydration of Button Mushroom (*Agaricus bisporus*) : Optimization of Process Parameters-Part 2, Mushroom Research Vol (25) in press.

Technical Bulletin

Anila Doshi, Kala Nath, Avinash Kumar Nagda.2015. Mushroom Ki Kheti, Technical Bulletin No. 6, Page:06, AICRP Mushroom.

Thesis

Renu Kumari Gupta. 2014. Bioremebation of heavy metals through cultivated and wild mushroom. Ph.D thesis submitted to Maharana Pratap University of Agriculture & Technology, Udaipur (Raj.) under Inspire fellowship.

Coimbatore Centre

Srinivasan, V.M., Krishnamoothy,A.S.,Kuttalam,S., Raguchander and Chinnamuthu, C.R.2014. Performance evaluation of azoxystrobin in the control of fruit rot and powdery mildew diseases on chilli. *Pestology*. 1118(4): 64-68.

Sumathy, R., R.Kumuthakalavalli, A.S.Krishnamoorthy and Venkatesh balan, 2015. Phytochemical investigation and total Antioxidant Potential of the Milky mushroom, Calocybe indica var. APK2 cultivated in Tamilnadu, India. *Int J Pharm Bio Sci.* 6(2): (P) 485 – 497

Sumathy, R., R.Kumuthakalavalli, A.S.Krishnamoorthy and Venkatesh Balan, 2015. Effect of phytochemicals and antioxidant compounds enriched extract from *Calocybe indica* var. APK2 on proliferation of human MCF-7 breast carcinoma cells. *Der Pharmacia Sinica*, 2015, 6(2):6-11

Sumathy, R., R.Kumuthakalavalli and A.S.Krishnamoorthy. 2015. Prroximate, vitamin, aminoacid and mineral composition of milky mushroom, *Calocybe Indica* (P&C). var. APK2, commonly cultivated in Tamilnadu. *J. Nat. Prod. Plant Resour.*, 2015, 5 (1):38-43

Krishnamoorthy, A.S. 2014. Biodiversity exploration of Milky mushroom (*Calocybe indica* P&C) – Concept to Commercialization. In: *Proc. of 8th Int. Conf. on Mushroom Biology and Mushroom Products vol.II* (ed. Manjit Singh *et al.)*, organized by WSMBMP, ICAR-DMR and MSI, 19-22 Nov.2014, NASC Complex, Pusa, New Delhi. pp:490-495.

Ganesh Kumar, M. and A.S.Krishnamoorthy.2014. Exploration of antifungal bio-active compounds of Pisolithus tinctorius (Pers.) Coker against soil borne plant pathogens. In: *Abstr. of 8th Int. Conf. on Mushroom Biology and Mushroom Products vol.II* (ed. Manjit Singh *et al.)*, organized by WSMBMP, ICAR-DMR and MSI, 19-22 Nov.2014, NASC Complex, Pusa, New Delhi. p: 139.

Sangeetha, C., Krishnamoorthy, A.S., Nakkeeran, S., Ramakrishnan, S. and Govindaraju, P. 2014. Efficacy of bioactive molecules of *Ophiocardyceps sinensis* (Berk.) Sacc. against *Fusarium Oxysporum* f.sp.*cubense* (E.F.Smith), the Panama wilt pathogen of banana, and its predisposing nematode, *Meloidogyne incognita* (Kofold& White) Chit. In: *Abstr. of 8th Int. Conf. on Mushroom Biology and Mushroom Products vol.II* (ed. Manjit Singh *et al.)*, organized by WSMBMP, ICAR-DMR and MSI, 19-22 Nov.2014, NASC Complex, Pusa, New Delhi. p: 140.

Senthilmurugan, S., Prabhu Krishnan and A.S.Krishnamoorthy.2014. Performance evaluation of Volvariella volvacea (Bull.ex Fr.) Singer strain PS 1 for outdoor cultivation in maize field. In: *Abstr. of 8th Int. Conf. on Mushroom Biology and Mushroom Products vol.II* (ed. Manjit Singh *et al.)*, organized by WSMBMP, ICAR-DMR and MSI, 19-22 Nov.2014, NASC Complex, Pusa, New Delhi. p: 79.

Krishnamoorthy, A.S., Ragul, M., Srinivasan, V.M. and Ganeshkumar, P. 2015. Mycomolecules and Blooming Biotech Business Opportunities - *The Changing Scenario of Small Mushroom to Big Industry.* Lead paper presented in the Session VII-Food Mycology during 36th Ann. Conf. and National Symposium organized by ISMPP between 12-14th Feb.2015 at AC& RI, Madurai.

Awards / Medals / Honour / Recognition

Dr. A. S. Krishnamoorthy has been nominated as the **Chief Editor of *Madras Agricultural Journal*** (Estd.1911)– An official Journal of Madras Agricultural Students' Union, TNAU, Coimbatore since November 2014.

S.Senthilmurugan, K.Prabu and A.S.Krishnamoorthy. 2015.Effect of spent mushroom substrate on the multiplication of *Trichoderma viride*. I Prize for the Best Poster Presentation – EPP Session. 36th Ann. Conference and National Symposium organized by ISMPP between 12-14th Feb.2015 at AC& RI, Madurai

Sangeetha C, Krishnamoorthy A. S., Nakkeeran, S., Ramakrishnan, S and Amirtham, D. 2015. Evaluation of bioactive compounds of *Ophiocordyceps sinensis* [Berk.] Sacc. against *Fusarium* spp II Prize for the Best Poster Presentation – Food Mycology Session. 36th Ann.Conference and National Symposium organized by ISMPP between 12-14th Feb.2015at AC& RI, Madurai.

Vellayani Centre

Lulu Das, Deepa Rani and Lishma.2014. Exploiting natural wealth to sustain the much fancied Calocybe in Kerala, India.poster presented at the 8th ICMBMP New Delhi from 19th to 22nd November

Lulu Das 2014.Biodiversity conservation and domestication of wild edible mushrooms of Kerala, India. paper presented at the World biodiversity Congress held at Colombo from 24th to 27th November 2014 .

Lulu Das 2014. Innovative Mushroom Cultivation technology –a promising venture for disability management. Paper presented at the International symposium on assistive Technology for rehabilitation and disability management held at Trivandrum from 2nd to 4th December 2014.

Lulu Das 2014 Effective utilization of coconut bio resources for mushroom cultivation. Souvenir released in connection with the launching of Neera pp.23-24

Deepa Rani C.V. and Lulu Das.2014. Suitability of Shiitake mushroom (*Lentinula edodes* (Beek.) Peglee) for cultivation under Kerala condition. Poster presented at 8th ICMBMP at New Delhi

Deepa Rani. C.V , Lulu Das and Lishma N.P. 2014. " *Lentinula edodes*"- A new addition to Kerala mushroom flora. Poster presented in National seminar on beneficial fungi with special reference to mushroom cultivation , mycorrhiza and fungi as biocontrol agents at Nirmala College ,Moovattupuzha , Kerala on 4th and 5th December 2014.

Lishma N.P,Dr. Lulu Das and Deepa rani .C.V. 2014. Effect of different grain substrates for spawn production white button mushroom (*Agaricus bisporus*) in Kerala. Poster presented in National seminar on beneficial fungi with special reference to mushroom cultivation, mycorrhiza and fungi as biocontrol agents at Nirmala College ,Moovattupuzha , Kerala on 4th and 5th December 2014.

Deepa Rani C.V. and Lulu Das.2014. Bioconversion of lignocellulosic agro wastes for the cultivation of Shiitake mushroom.poster presented on 2nd National biodiversity conference 2014 at Kanakakunnu palace ,Trivandrum on 26th and 27th February 2015.

Ranchi Centre

Maurya,S., R. Kumar, Anjali Kumari, J. S. Choudhary and S. Kumar**,** 2014. Substrate decomposing fungi of mushroom and their management by some common fungicides. Vegetos, 27:240-244.

Pantnagar Centre

Gajendra Singh Jeena, H. Punetha, Om Prakash, Mahesh Chandra and KPS Kushwaha (2014). Study on *in-vitro* antioxidant potential of some cultivated *Pleurotus* species (Oyster mushroom). *Indian Journal of Natural Products and Resources*.5(1):56-61.

Neelam, Vinod Upadhyay and KPS Kushwaha (2014). Effect of *Alcaligens faecalis* supplementation to different casing mixture on its physic-chemical properties and yield stimulation of *Agaricus bisporus*. *The Bioscan. 9(2): 659-661.*

Mishra KK, Prachi Mishra and KPS Kushwaha (2014). Biochemical characterization of winter mushroom Flammulina velutipes (Curt. Fr.) Sing. *Indian Journal of Mushroom*. 32(1) 4-6.

Mishra, SK; Geeta Sharma, Neelam and KPS Kushwaha (2014). Technological and marketing fissures of button mushroom at traditional and scientific know-how in mid hills of Uttarakhand State, India Proceeding of the 8th International conference on Mushroom Biology and Mushroom Products Vol. II. 635-639

Rakesh Kumar and K.P.S. Kushwaha (2014). Evaluation of different strains of oyster mushroom for their cultural, morphological and yield attributes. Proceeding of the 8th International conference on Mushroom Biology and Mushroom Products Vol. I. 351-355

Neelam, K.P.S.Kushwaha and S.K. Mishra. (2014). Yield Performance and Element Profiling of Different Strains of *Lentinula edodes* (Berk.) Pegler. Proceeding of the 8th International conference on Mushroom Biology and Mushroom Products Vol. I. 365-368

Geeta Sharma, S.K.Mishra and K.P.S. Kushwaha (2014). Genetic Characterization of Single Spore Isolates of *Agaricus bisporus* (Lange) Imbach. Proceeding of the 8th International conference on Mushroom Biology and Mushroom Products Vol. I. 145-150.

Mishra, SK; Geeta Sharma, Neelam and KPS Kushwaha (2014). Technological and marketing fissures of button mushroom at traditional and scientific know-how in mid hills of Uttarakhand State, India. Proceeding of the 8th International conference on Mushroom Biology and Mushroom Products Vol. II. 635-639

Arun Kushwaha, Vinod Upadhyay, SK Mishra, Geeta Sharma, KPS Kushwaha and HN Singh (2014). Promotion of mushroom production technology as additional source of Income of Tribal Community in Hills of Uttarakhand. (*Abst*.) National workshop on Retrospective and Prospective Analysis of Indian Agriculture: The Roadmap Ahead w.e.f. Nov. 17-18, 2014 organized by Directorate of Experiment Station, GBPUA&T, Pantnagar. 205p.

Tanvi Gaur, PB Rao, KPS Kushwaha (2014). Effect of temperature and packaging materials on shelf life of button mushroom (*Agaricus bisporus*). (*Abst*.) National workshop on Retrospective and Prospective Analysis of Indian Agriculture: The Roadmap Ahead w.e.f. Nov. 17-18, 2014 organized by Directorate of Experiment Station, GBPUA&T, Pantnagar. 270p.

8. PERSONNELIA

Staff position at various AICMIP Centres during 2014-15

Sl.No	AICRP Centre	Name of staff	Designation
A.	**ICAR Institute based Centre**		
1.	ICAR Research Complex for NEH Region, Umiam 793 103, Meghalaya	Dr Pankaj Baiswar	Sr. Scientist, Plant Pathology
2.	ICAR Research Complex for Eastern Region, Research Centre, Plandu, Ranchi 834010 (Jharkhand)	Dr. Sudarshan Maurya	Sr. Scientist, Plant Path
B.	**SAU based Centre**		
1.	Dept. of Plant Pathology, Centre for Plant Protection studies, Tamil Nadu Agricultural University, Coimbatore - 641 003	Dr AS Krishnamoorthy Th.P.Arumugam Th.P.Karuppusamy Th.C, Sundararajan Th.Venkatesan Th. P.Selvaraj	Professor Laboratory Assistant Lab Assistant Lab.Tecnician Skilled mazdoor
2.	Centre for Tropical Mushroom Research and Training, Dept. of Plant Pathology, Orissa Agricultural University, Bhubaneswar, Orissa	Dr. K.B. Mohapatra	Associate Professor
3.	Department of Plant Pathology N. D. University of Agriculture & Technology, Kumarganj, Faizabad – 224 229 (U.P.) India	Dr. Pradeep Kumar Sri Vijay Kant Sri G.P. Gautam Sri Brij Bhushan Sri Lalta Prasad	Mycologist Field Man Technician L.D.C./Typist Beldar
4.	Dept. of Plant Patholgy, College of Agriculture, CCS Haryana Agricultural Univ., Hisar - 124 005	Dr. Surjit Singh	Professor
5.	Department of Microbiology, College of Basic Sciences and Humanities, Punjab Agricultural University, Ludhiana – 144 001.	Dr (Mrs) S. Dhanda Dr. H. S. Sodhi Dalip Singh Mr. Gurdev Singh Harminder Kr Ram Kumar	Sr. Mycologist Sr. Mycologist Sr Laboratory Assist. (Technician) Fieldman Typist-cum-Clerk Beldar
6.	Mushroom Research and Training Centre, G.B. Pant University of Agri. & Tech., Pantnagar – 263 145 (Uttarakhand)	Dr. KPS Kushwaha Dr SK Mishra Mr. Himanshu Joshi Sh. Ramakant Singh Shri Santosh Kumar Sh. Deo Kumar	Mycologist JRO- Mushroom Technical Assist. Jr. Assist./Fieldman Typist/clerk Beldar
7.	Dept of Plant Pathology,Collage of Horticulture and Forestry,Central Agricultural University, Pasighat – 791 102 (Arunachal Pradesh)	Dr. RC Shakywar	Assistant Professor

Sl.No	AICRP Centre	Name of staff	Designation
8.	Plant Pathology Section, College of Agriculture, Mahatma Phule Krishi Vidyapeeth, Pune-411 005	Dr. D.B.Shinde Dr. Jadhav Shri V. K. Bhalerao Shri. N. G. Desai Shri.S. G. Hingmire Shri. Y.S. Bhave	Mycoligist Jr. Mycologist Jr. Res. Asstt Agril. Asstt. LDC/Typist Beldar
9.	Mushroom Research Laboratory, Dept. of Plant Pathology, Indira Gandhi Krishi Vishwavidyalya, Raipur – 492 006 (Chhattisgarh)	Dr. G. K. Awadhiya Dr. Harvinder Singh Shri B. L. Sinha Shri R. K. Pandey Shri A. R. Sahu	Mycologist Assistant Mycologist Field Assistant LDC Peon (Beldar)
10.	Department of Microbiology, Faculty of Basic Sciences and Humanities, Rajendra Agricultural University, Pusa (Samastipur) - 848 125 (Bihar)	Dr. Dayaram	Associate Professor
11.	Dept. of Plant Pathology, Rajasthan Collage of Agriculture, Maharana Pratap University of Agric. & Tech., Udaipur – 313 001 (Rajasthan)	Dr. Anila Doshi Mrs. Kala Nath Mr. Nathu Singh Mr. Kishan Singh	Mycologist Field Supervisor L.D.C. Beldar
12.	Department of Plant Pathology, College of Agriculture, Vellayani – 695 522 Thiruvananthapuram, (Kerala)	Dr. Lulu Das Ms. Deepa Rani	Mycologist Technical Assistant
C.	**Cooperating Centre**		
1.	Mushroom Research & Production Unit, Department of Mycology and Plant Pathology, Dr. Y.S. Parmar Univ. of Horticulture and Forestry, Nauni – 173 230, Solan (HP)	Dr. Dharmesh Gupta	Sr. Scientist
2.	Haryana Agro Industrial Corperation R & D Centre, Opp. DCR University, G.T. Road, Murthal, Sonepat (Haryana)	Dr. Ajay Yadav	Scientist

9. BUDGET / RELEASED 2014-15

Centre	Recuriing Contingency (Rs. Lakh)						NEH		TSP		Non-Recurring Contingency (Rs. Lakh)				Total (Rs. Lakh)
	Estt. Charges		T.A.		Contingency including FLD						Equipments		Works		
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	
MPUAT, Udaipur	27.95	27.95	0.50	0.50	3.00	3.00	-	-	1.00	1.00	1.00	1.00	3.00	3.00	27.95
NDUAT, Faizabad	15.95	15.95	0.25	0.25	0.50	0.50	-	-							15.95
IGKVV, Raipur	34.25	34.25	0.75	0.75	2.00	2.00	-	-	2.00	2.00	3.00	3.00	7.50	7.50	34.25
MPKVV, Pune	24.90	24.90	0.50	0.50	3.00	-	-	-	-	-	1.50	1.50	1.50	1.50	24.90
TNAU, Coimbatore	21.00	21.00	0.50	0.50	2.50	2.50	-	-	-	-	-	-	-	-	21.00
GBPUAT, Pantnagar	4.00	4.00	0.50	0.50	2.50	2.50	-	-	-	-	-	-	-	-	4.00
PAU, Ludhiana	30.35	30.35	0.50	0.50	3.00	3.00	-	-	-	-	0.75	0.75	1.10	1.10	30.35
KAU, Kerala	17.35	17.35	0.50	0.50	3.00	3.00	-	-	-	-	2.85	2.85	6.00	6.00	17.35
RAU, Pusa (Bihar)	14.85	14.85	0.50	0.50	3.00	3.00	-	-	1.00	1.00	1.70	1.70	4.50	4.50	14.85
CCSHAU, Hisar	14.80	14.80	0.50	0.50	3.00	3.00	-	-	-	-	2.00	2.00	4.50	4.50	14.80
OUAT, Bhubaneshwar	3.85	3.85	0.50	0.50	2.35	-	-	-	1.00	1.00	-	-	-	-	3.85
UHF, Nauni	2.00	2.00	0.50	0.50	1.50	1.50	-	-	-	-	-	-	-	-	2.00
HAIC, Murthal	6.15	6.15	0.50	0.50	5.65	5.65	-	-	2.00	2.00	-	-	-	-	6.15
ICAR RC ER, Ranchi	6.50	6.50	0.50	0.50	2.00	2.00	—	-	-	-	2.00	2.00	-	-	6.50
CAU, Pasighat (Arunachal Pradesh)	4.50	4.50	0.50	0.50	2.00	2.00	2.00	2.00	-	-	-	-	-	-	4.50
ICAR RC NER, Barapani	16.60	16.60	0.50	0.50	3.00	3.00	3.00	3.00	3.00	3.00	7.10	7.10	-	-	16.60

a- sanctioned amount
b- actual release