



वार्षिक प्रतिवेदन ANNUAL REPORT 2016-17

अखिल भारतीय समन्वयित खुम्ब अनुसंधान परियोजना
All India Coordinated Research Project on Mushroom

अखिल भारतीय समन्वयित खुम्ब अनुसंधान परियोजना
ALL INDIA COORDINATED RESEARCH PROJECT ON MUSHROOM

भा.कृ.अनु.प. – खुम्ब अनुसंधान निदेशालय



ICAR-Directorate of Mushroom Research

चम्बाघाट, सोलन – 173 213 (हिमाचल प्रदेश)
Chambaghat, Solan –173 213 (HP)

ANNUAL REPORT 2016-17

All India Coordinated Research Project on Mushroom

ICAR-Directorate of Mushroom Research

Solan-173 213, India

Compiled and edited by : **Dr Shwet Kamal**, Sr. Scientist
BL Attri, Principal Scientist

Published by : **Dr. V P Sharma** Project Coordinator, AICRPM
ICAR-Directorate of Mushroom 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

Designed and printed by
Azad Offset Printers.

144, Press Site, Industrial Area-1, Chandigarh

Tel. : 0172-4611489, 2656144, 2657144, 98140-11543, 98141-11543, 99141-11543

Email : aop144@gmail.com

PREFACE

Mushrooms, like number of other entheogenic plants, played an important role in development and cultural structure of many primitive societies. It is because of the special chemical compounds found in these healing plants, which ancient man first discovered as he hunted for food that modern science started documenting it. It is thus very important to gather this information as well as collect and conserve the mushrooms identified as edible or medicinal by our ancestors.

Quality food, health, and environment are the three key issues of concern to mankind. These problems are bound to increase as the world's population grows. Mushroom cultivation offers meaningful solutions to these issues (1) the generation of relatively cheap source of high quality food protein, (2) the provision of health-enhancing dietary supplements/ mushroom nutraceuticals and (3) the bioconversion/bioremediation of various residues and maintenance of balanced ecosystems.

The Indian mushroom industry has come a long way since 1960s when the first experiments were conducted on button mushroom. Since then number of other mushroom species have been brought under cultivation in the country. The diverse agro climate, colossal amount of agricultural wastes, cheap labor and availability of suitable strains and cultivation technology have contributed to the growth and diversification of this industry. Today the Indian mushroom industry comprises of temperate species like button mushroom, sub tropical species like oyster and shiitake mushrooms and tropical species like Paddy straw, Milky and Reishi mushrooms. During last four decades our country has registered twenty-fold increase in production of mushrooms and the present production of the country has touched 1.30 lakh tons. Although, mushroom science as well as production technology has also witnessed newer innovations and applications, technology development, refinement and standardization for different agroecological region is a continuous process. Also, continuous skill-upgradation of human resources will be indispensable to keep pace and to move ahead in R&D.

To achieve this goal and 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 IGKV, 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 2016-17 was

finalized in the annual workshop organized at ICAR-DMR, Solan on 9-10 June, 2016. 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, shiitake 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.

(Project Coordinator)

CONTENTS

Preface	III
Summary	1
Introduction	3
Mandate and Objectives	5
Technical Programme (2016-17)	7
Research Progress (2016-17)	18
Collection, Identification and Conservation of Wild Edible Germplasm	32
Extension activities	58
Publications	109
Personalia	120
Budget	123

SUMMARY

All India Coordinated Research Project on Mushroom functions in a coordinated manner in association with twenty three coordinating and nine 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 (2016-17), the research trials were conducted at all the thirty two centres based on technical programme finalized during the annual group meeting of AICRPM workers held on 9-10 June 2016 at ICAR-DMR, Solan.

Different Centres have reported the collection of specimens of wild mushrooms during the year and about 378 collections have been made and a total of 200 specimens were deposited at the DMR Gene Bank with passport data and a total of 136 specimens have been assigned accession numbers. 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.

During the year 2016-17, experiments were conducted on strainal evaluation of five different mushrooms i.e. white button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus* spp.), paddy straw mushroom (*Volvariella volvacea*), milky mushroom (*Calocybe indica*) and shiitake

mushroom (*Lentinula edodes*) at various centres. Strain evaluation trials of white button mushroom were on advance varietal trial -2 for selected white accessions of *Agaricus bisporus*. In the trials conducted using the short method compost, the maximum yield of 22.63 kg per 100 kg of compost was recorded in the strain AVT-16-02 at Samastipur Centre followed by 22.38 kg in AVT-16-01 at the same centre. The strain AVT-15-04 has performed the best at all the centres giving average yield of 19.32 kg/100 kg compost.

A total of six strains of *Volvariella volvacea* were tested at six different locations. The maximum yield of 17.70 kg/100 kg of dry substrate was recorded in strain Vv-16-06 at Ludhiana followed by Vv-16-02 strain (17.27 kg/100kg dry straw) in Coimbatore and Vv-16-03 at Ludhiana centre. It was also recorded that the all the test strains performed well with good biological efficiency at the Bhubaneshwar centre. The minimum biological efficiency of 1.17 kg/100 kg dry straw was recorded in Vv-16-06 at Coimbatore centre. Overall average showed that the maximum BE (14.89 kg) was recorded in Vv-16-02 strain while the minimum BE (9.19 kg) was in strain Vv-16-05.

The trial on evaluation of high yielding varieties/ strains of oyster mushroom was conducted at 22 different centres. A total of four high yielding strains of *Pleurotus* species were under evaluation trial. All the strains under testing gave maximum biological efficiency at Pune centre with a maximum BE ranging between 83-98 kg/100 kg of dry straw. However, the maximum BE was recorded to be 106% at Portblair centre in Pl-16-03 strain. Also the lowest BE of 20.74 % was recorded at Manipur centre in the strain Pl-16-03 itself. Overall average showed maximum average BE of 66.07 kg/100 kg straw in PL-16-02 strain.

This trial was allotted to eleven different Centres and five strains of milky mushroom

were to be evaluated. But due to late receipt of the cultures and low temperature, all the centres could not complete the experiment. Some centres where the temperature was suitable, the experiment was carried out. But where the temperature was not suitable, the experiment is ongoing. Till now five centres have completed the experiment and reported the results. Amongst these centres, the maximum yield of 104 kg/ 100 kg straw was obtained at the Coimbatore centre in CI-16-03 strain followed by CI-16-01 strain (79.17 kg/100 kg straw) at Pantnagar centre. Minimum yield of 6.38 kg/ 100 kg straw was obtained in CI-16-02 strain at Pantnagar centre. Overall average showed that CI-16-03 performed the best amongst the strains tested with overall average of 57.57 kg per 100 kg dry substrate.

This trial was allotted to nine different centres and four strains of shiitake mushroom (LE-16-01 to LE-16-04) were to be evaluated. The evaluation was to be done on two substrates i.e. saw dust and wheat straw. A total of three centres have reported successful results of the experiment. At rest of the six centres the experiment is ongoing and results could not be reported. The maximum biological efficiency of 218 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in LE-16-04 while the same strain showed a lower BE of 32 kg / 100 kg of dry substrate on wheat straw based substrate. Strain LE-16-01 also gave high BE of 130 kg/100 kg of dry saw dust substrate at the same centre. Highest biological efficiency on wheat straw substrate was recorded to be 92.00 kg /100 kg substrate at murthal centre itself. Lowest BE was of 1.60 kg / 100 kg of dry substrate was also recorded at Murthal centre in the strain LE-16-03 on wheat straw based substrate. Overall average biological efficiency showed that the strain LE-

16-02 performed the best on wheat straw substrate while LE-16-04 performed best on saw dust substrate.

A new initiative to use spent button mushroom compost in the preparation of fresh compost was developed at DMR, Solan, which offers effective use of spent mushroom substrate and does not create environment pollution. The trial was assigned to three different centres i.e. Murthal, Ludhiana and Pune. Only one centre reported successful results of the experiment are Ludhiana Centre. Two strains namely, S-11 and U-3 of button mushroom were used for the experiment. *Agaricus bisporus* strains U3 and S11 were grown on wheat straw and spent mushroom substrate based compost. Four replicates each with ten bags for each compost formula were laid in random block design (RBD) to accommodate 240 bags. Beds were cased after 17-19d for U3 and 19-24d for S11 of spawning. Pinheads appeared in 22-26d for U3 and 23-27d for S11 after casing. The first crop was harvested between 24-29d for U3 and 25-30d for S11 after casing and lasted for 4 weeks. The yield data indicated maximum yield for the compost formula no. I (15.55 kg/q compost for U3 and 12.30 kg/q compost for S11).

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, farmwomen, 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

The All India Coordinated Research Project on Mushroom (AICRP-M) came into existence during VI Five-Year Plan on 01.04.1983 with its Headquarters at Directorate of Mushroom Research, Solan (HP) to test and disseminate the technology developed at Directorate of Mushroom Research in different agro-climatic regions of the country and popularize mushrooms as secondary agriculture along with the existing farming system. The Director, DMR, Solan (HP) also functions as the Project Coordinator of the project. Initially the AICRPM started with six Centres one each at Punjab Agricultural University, Ludhiana (Punjab), G.B.Pant University of Agriculture and Technology, Pantnagar (Uttarakhand), C.S. Azad University of Agriculture and Technology, Kanpur (UP), Bidhan Chandra Krishi Vishwa Vidyalaya, Kalyani (West Bengal), Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu) and Mahatma Phule Agricultural University, Pune (Maharashtra). At a later stage during VII Plan, one new Centre at Indira Gandhi Krishi Vishwa Vidyalaya, Raipur (Chattisgarh) was added and two existing Centres at Kanpur (UP) and Kalyani (West Bengal) were dropped. However, three new Centres during VIII Five Year Plan and 3 Coordinating and one co-operating Centres during IX Five Year Plan were added to the existing list of Centres by dropping one at Goa. Four Coordinating and one Cooperating Centres have been added during XI Plan at OUAT, Bhubaneswar (Orissa), HAU, Hisar (Haryana), RAU, Pusa, Samastipur (Bihar), Central Agriculture University, CoA, Pasighat (Arunachal Pradesh) and one Cooperating Centre at HAIC, Murthal (Haryana). During the XII five year plan 9 more coordinating and 8 cooperating centre were added. Faizabad centre was dropped and in place of Faizabad, CSKHPKV, Palampur is added as the

coordinating centre. HAIC murthal was upgraded as coordinating centre from cooperating centre.

At present, 23 Coordinating and 9 co-operating Centres are working under AICRPM. These are:

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)
- 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 Agriculture and Technology, Bhubaneswar (Orissa)
- Rajendra Agricultural University, Samastipur, Pusa (Bihar)
- College of Horticulture and Forestry, Central Agricultural University, Pasighat (Arunchal Pradesh)
- CSKHPKV, Palampur (HP)

State Govt based Coordinating Centre

- HAIC Murthal (Haryana)

ICAR Institute based co-ordinating centres

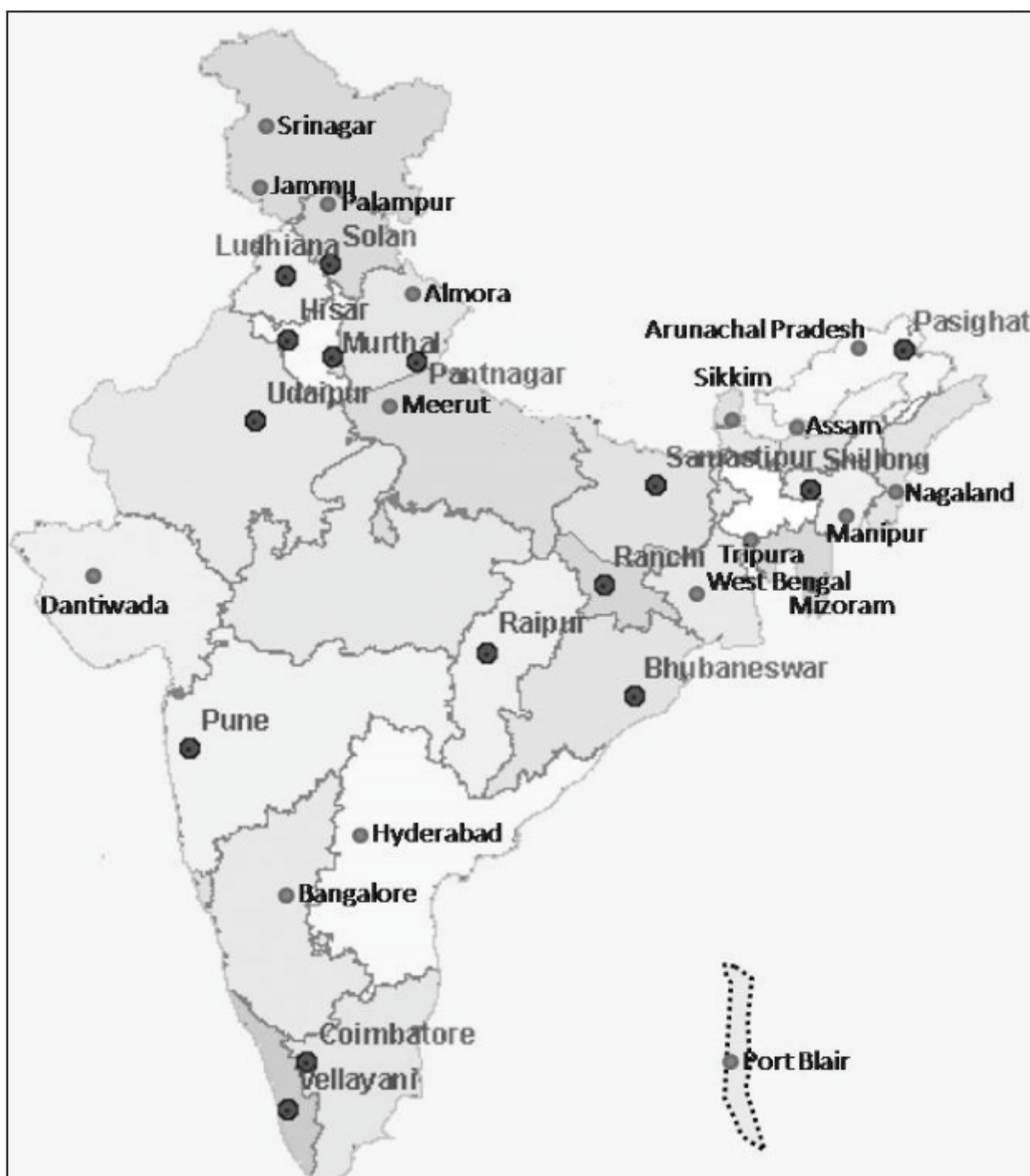
- ICAR Research Complex for NEH Region
 - o ICAR Research Complex for NEH region, Barapani (Meghalaya)
 - o ICAR – National Organic Farming Research Institute, Sikkim
 - o ICAR Research Complex for NEH region, Arunachal Pradesh
 - o ICAR Research Complex for NEH region, Nagaland
 - o ICAR Research Complex for NEH region, Manipur
 - o ICAR Research Complex for NEH region, Mizoram
 - 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 Islands)
- ICAR-Indian Institute of Horticultural Research, Bangalore

Co-operating Centres

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

The last Group meeting of workers of AICRPM was held on 9-10 June, 2016 at ICAR-Directorate of Mushroom Research, Solan. During the meeting the progress of last year (2015-16) was monitored and technical programme for 2016-17 was finalized.

2. MANDATE AND OBJECTIVES



Geographical location 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 2016-17**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 • The collection may be done area wise/ district wise
- Information about local names may be collected to avoid duplication
 - Rainfall and temperature data, indicate month and season of appearance
 - 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 data on mushroom if collected from market
- d) Proforma for data on mushroom if collected from market

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, 30-35C)	

* 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 VP Sharma, Director, ICAR-DMR at director.mushroom@icar.gov.in and Dr Shwet Kamal at shwetkamal@gmail.com

Proforma for mushroom identification

Collector's Name:

Name of the PI:

Centre's Name:

• Specimen no.	
• Date of collection	
• Locality	
• GPS Data	
Longitude	
Latitude	
Altitude	
• Single, in groups or connate (United) Habitat	
• (Humus, wooden stumps or trees, dung, sand, or any other)	
• Smell (Y/N)	
• Spore print colour	
• Cap	
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 (in case of gill fungi) Scale on cap: gills, tooth, tubes, pores	
Attachement: Free, adnased (just touching stem), adnate (broad by attached), Shortly decurrent (running on the stem apex) Gill colour Gill Edges	
• Edibility (edible/non-edible/ medicinal/ poisonous)	
• 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	

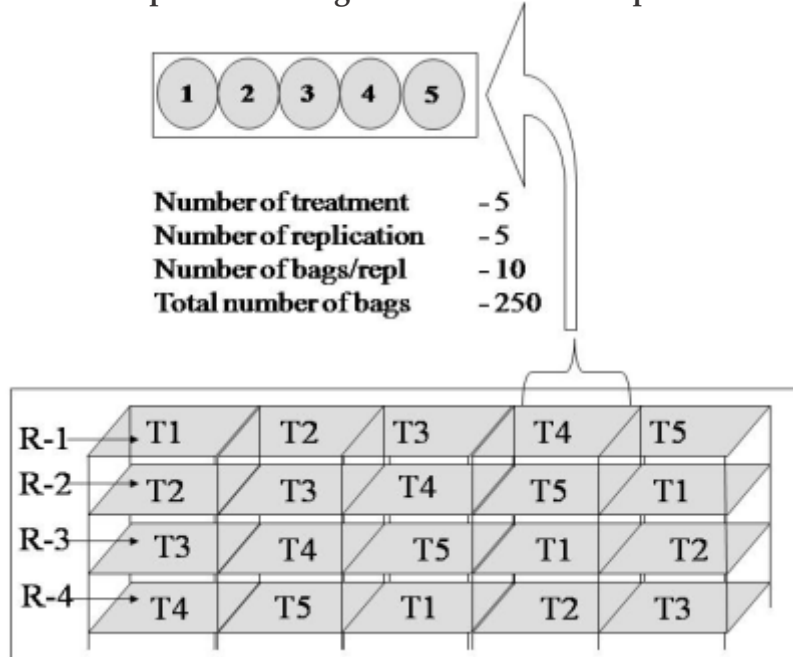
Expt. 02: Advanced varietal trial-2 for selected white accessions of *Agaricus bisporus*

- | | |
|--|---|
| a) Participating centres | <ul style="list-style-type: none"> • Pantnagar, Murthal, Nauni, Pune, Ludhiana, Palampur, Samastipur and Solan |
| b) Substrate | <ul style="list-style-type: none"> • Substrate quantity- 8 kg compost/bag • No. of replications- 6 replications each with 10 bags of 8 kg compost/replicate for each strain in RBD. |
| c) Strains to be evaluated | <ul style="list-style-type: none"> • AVT-15-01 to AVT-15-05 (Cultures to be provided by September) |
| d) Methodology to be adopted | <p>Short Method</p> <ul style="list-style-type: none"> • 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(1.75 to 2.2%), colour, pH (7.2 to 7.8), moisture (< 60%), ammonia, bulk density (kg per m³) may be reported for each trial |
| e) Spawning rate to be used | 1 % of wet compost |
| f) Data to be recorded during 4 weeks cropping | <ul style="list-style-type: none"> • 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 CaCO₃). • 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 for gill size, pileus length, stipe thickness, firmness of fruit body, etc. Photographs of TS of each strain must be supplied.
- g) Environmental conditions • Spawn run: Bed Temp-24+1°C, RH-90-95%, CO₂->10,000 ppm
to be maintained inside • Case run: Bed Temp-24+1°C, RH-90-95%, CO₂->10,000 ppm.
cropping room • Cropping: Bed Temp 16-18°C, RH 80-85%, CO₂-<1000ppm
- h) Bag size 20"x24" (polythene - 150 gauge)

Note: The 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: director.mushroom@icar.gov.in; shwetkamall@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-2 of *A. bisporus*



Expt. 03: Advanced varietal trial-1 for strains of Paddy Straw Mushroom, *Volvariella volvacea*)

- a) Participating centres • Coimbatore, Bhubaneswar, Ranchi, Ludhiana, Hisar, Raipur, Jorhatb)
- b) Substrate • Paddy straw bundles (45 cm x 15 cm) – 500 g each soaked for 12-14 hours in CaCO₃ mixed water (@1.5%)
- c) Method • Bundle method (3 bundles 4 layers + 1 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
Bed Size 1.5 x 1.5 x 1.5 cubic ft (Preferably)
- d) Strains
- Vv-16-01 to Vv-16-06 replications each with 3 beds for each strain
- e) 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: director.mushroom@icar.gov.in; 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. 04a: Advance varietal trial-1 of high yielding varieties/strains of Oyster Mushroom (*Pleurotus* spp)

- a) Participating centres
- Winter trial < 20°C**- Pune, Raipur, samastipur, Pantnagar, Bhubaneswar, Udaipur, Hisar, Ranchi, Barapani, Manipur, Kalyani, Jammu, Srinagar, Mizoram, Palampur, Jorhat, Nagaland
- Summer trial (>20°C)**- Pune, Raipur, samastipur, Pasighat, Pantnagar, Vellayani, Coimbatore, Bhubaneswar, Udaipur, Hisar, Ranchi, Barapani, Manipur, Port Blair, Bangalore, Jammu, Sikkim, Mizoram, Palampur, Almora, Jorhat
- b) Substrate
- Wheat straw or paddy straw
- Presoaking for 4 h for wheat straw; and 2 h for paddy straw
- Substrate treatment: Hot water treatment 65°C for 30 min for paddy straw and 1 h for wheat straw
- Dry for minimum 4 h under open

- pH to be adjusted to 7.50 with CaCO_3
- Substrate quantity: 1 kg dry wt. (with 70 % moisture)/ bag
- No of replications: 6 replication each with 8 bags and all bags of one replication to be placed in one tier (RBD)
- c) Containers Polybag (30 x 45 cm)
- d) Season for laying trials Two trials during Sept-Oct and March-April of all the strains
Temp range – 25-30°C e) Spawn rate 500g spawn for 5 kg dry substrate
- f) Varieties Six new strains of *Pleurotus* – Three strains along with *P. florida* as winter control and *P. sajor caju* as summer control
- 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, 1 st 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									
	-									
	R-5									

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:

director.mushroom@icar.gov.in; 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. 05. Repeat Advanced varietal trial-1 for high yielding strains of Milky mushroom (*Calocybe indica*)

- | | |
|---|--|
| a) Participating centres | Coimbatore (PS), Raipur (WS), Samastipur (WS/PS), Pantnagar (WS), Murthal (WS), Udaipur (WS), Meerut (WS), Hisar (WS), Bhubaneswar (PS), Vellayani (PS), Pune (WS), Pasighat (PS) |
| | WS = Wheat straw; PS = Paddy straw |
| b) Strain | CI-15-01 to CI-15-06 |
| c) Substrate | Wheat straw/paddy straw |
| d) Supplement | – |
| e) Method of substrate preparation | Hot water treatment (presoaking the wheat/paddy straw for 4h followed by boiling the straw bits for 30-45 min at 80°C. The substrate is shade dried to maintain 60-65% moisture at the time of bag filling) |
| f) Spawn rate | 4% (on wet weight basis) |
| g) No. of replication | 4 replication of 6 bag each |
| h) Bag size | 3.0 kg wet weight (60 x 30 cm and after spawn run cut in to half) |
| 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 | <ul style="list-style-type: none"> • Treat the substrate with hot water (65°C for 30 min for paddy straw and 1 h for wheat straw) • Method of spawning – layer spawning 4% wet weight basis • Spawn run temp – 28-30°C; RH – 80%; Light – diffused • Takes 20 days for substrate colonization and then casing is to be done. • Casing – 75% soil and 25% sand (clay loam soil with pH around 8.0) |

- Thickness – 2.0-2.5 cm; pH – 8.0 to be adjusted with chalk powder
- Casing autoclaved for 1 h about a week in advance.
- Apply 1 kg casing on each half of the bag
- 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: director.mushroom@icar.gov.in; shwetkamall@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.

Expt – 06: Advance Varietal trial-1 of Shiitake mushroom

a) Participating centres	Murthal, Vellayani, Bangalore, Pantnagar, Manipur, Nagaland, Hisar, Barapani, Nauni and Solan
b) Strain	LE-15-01 to LE-15-05
c) Substrate	i) Saw dust (Broad leaved hard wood trees) ii) Wheat straw
d) Supplement	wheat bran @ 20% and treatment with 1% CaCO ₃ on dry weight basis
e) Method of substrate preparation	Autoclaving
f) Spawn rate	% (on wet weight basis)
g) No. of replication	4 replication of 6 bag each
h) Bag size	2.0 kg wet weight
i) 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
j) Production technology to be followed	1. Take 40kg hard wood broad leaved trees' saw dust 2. Add water (55%) for thorough wetting overnight 3. Add wheat bran and thoroughly mix 4. Fill in polypropylene bags 2kg each and put ring and cotton plug 5. Autoclave at 126°C for 1 hour

6. On cooling spawn aseptically @5% wet weight basis.
7. Incubate at 24°C
8. After completion of spawn run (about 60 days) allow them to turn brown.
9. Remove the PP bags and dip the blocks in chilled water (4-5°C) for about 10 minutes.
10. Keep the block for fruiting at <20-22°C
11. Give rest 2-3 weeks
12. Repeat 9-10 steps again.

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: director.mushroom@icar.gov.in; shwetkamall@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. 07: Use of spent button mushroom substrate for button mushroom compost production (1st Trial)

Participating Centres	Pune, Ludhiana, Murthal, Solan
Composting method	Short method of composting
Composting treatments	1. Standard formulation: Wheat straw – 1000 kg, poultry manure – 700 kg, wheat bran – 150 kg, urea – 15 kg and gypsum – 35 kg 2. Wheat straw – 800 kg, poultry manure – 390 kg, wheat bran – 120 kg, urea – 12 kg, gypsum – 35 kg, SMS-445 kg 3. Wheat straw – 800 kg, poultry manure – 560 kg, wheat bran – 120 kg, urea – 12 kg, gypsum – 35 kg, SMS-445
Cropping conditions	Standard
Experiment size	10 bags/replication; 4 replication for all three treatments for both strain S-11 and U-3
Observations	1. Quality characteristics of finished compost (moisture, pH, nitrogen, C/N ratio, potassium, phosphorus) 2. Conversion ratio (finished compost/wheat straw used) 3. Fruit body yield (kg/100 kg finished compost) 4. Quality of fruit bodies (colour, wt., dry matter content, any other abnormality if any) 5. Disease and pest incidence, if any

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: director.mushroom@icar.gov.in; 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.

III. CROP PROTECTION

Expt. 08. Evaluation of different bacterial isolates and effect of pre spawning of casing soil prior to pasteurization on survival/inoculums of *Mycogone perniciosa*

a) Participating centres	Test only where the disease exists at farmer's field
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	Treatments after casing (Treatments 5-9) T-1- B-9 @ 10^6 - 10^7 cfu/ml/bag T-2- B-18 @ 10^6 - 10^7 cfu/ml/bag T-3- B-20 @ 10^6 - 10^7 cfu/ml/bag T-4- B-9 + B-18 @ 10^6 - 10^7 cfu/ml/bag T-5- B-18+B20 @ 10^6 - 10^7 cfu/ml/bag T-6- B-9+B20 @ 10^6 - 10^7 cfu/ml/bag T-7- B-9+B-18+B20 @ 10^6 - 10^7 cfu/ml/bag T-8- Uninoculated pasteurized casing soil (Control-1) T-9- Fresh casing soil (unpasteurized) (Control-2)
e) Spawning rate to be used	0.7% of wet compost
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: director.mushroom@icar.gov.in; shwetkamall@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
- Layouts as per AVT on button

V. EXTENSION**Expt-9. Generation of databases of mushroom farmers, spawn producers and total production of spawn and mushroom in your state****Participating centres: All**

Note: Reoprtng to be done to director.mushroom@icar.gov.in; shwetkamall@gmail.com; ygautamdmr@gmail.com.

VI. 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 held groups and candidates from lower.
3. Organization of two field 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.
11. 23rd December may be observed as Mushroom Day.

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 replication-wise 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 director.mushroom@icar.gov.in .
6. In case of no comments from your side, the technical programme may be treated as final.

4. RESEARCH PROGRESS

CROP IMPROVEMENT

1.1 Advanced varietal trial-2 for selected white accessions of *Agaricus bisporus*

This experiment was conducted on short method pasteurized compost at Pune, Pantnagar, Nauni, Ludhiana, Palampur, Murthal, Solan and Samastipur. The sample size of the experiment was four replications 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 the trials conducted using the short method compost, the maximum yield of 22.63 kg per 100 kg of compost was recorded in the strain AVT-

16-02 at Samastipur Centre followed by 22.38 kg in AVT-16-01 at the same centre. The strain AVT-16-04 has performed the best at all the centres giving average yield of 19.32 kg/100 kg compost. The strain AVT-16-02 performed poorly at Pantnagar centre due to bacterial contamination. At Ludhiana, Murthal and Palampur centres AVT-16-01 didn't perform well with a low yield of 9.55, 8.08 and 7.5 kg per 100 kg compost. But on other centres, the performance of the strain was good. Overall all the strains have performed well at all the centres barring poor performance of AVT-16-01 at some centres (Table 4.1).

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

<i>A. bisporus</i> strain	Pantnagar	Ludhiana	Murthal	Pune	Solan	Nauni	Palampur	Samastipur	Average
AVT-16-01	17.68	9.55	8.08	19.47	17.50	17.20	7.5	22.38	14.92
AVT-16-02	--	17.63	11.49	18.83	16.80	19.40	15.4	22.63	17.45
AVT-16-03	14.64	13.15	19.72	20.28	18.50	21.50	15.0	21.13	17.99
AVT-16-04	19.23	21.50	20.27	21.48	17.70	20.30	14.3	19.75	19.32
AVT-16-05	13.13	14.35	13.79	18.04	14.00	18.30	11.2	19.63	15.31
CD (0.05)	3.95	2.14	3.89	5.25	2.42	0.42	4.60	1.36	

The time taken in first harvest (days post casing) was in the range of 15-32 days. The lowest first harvest time (15 days) was recorded at Pantnagar in strain AVT-16-04. Overall the lowest first harvest time of 22 days was recorded in AVT-16-04 followed AVT-16-03 (Table 4.2).

Fruit body weight also varied at different centres and was recorded maximum (18 g) at

Pantnagar, Ludhiana, and Pune centre in the strain AVT-16-01, AVT-16-03 and AVT-16-03, respectively (Table 4.2). At headquarters the average fruit body weight ranged between 14-15 g in all the strains. On the basis of average fruit body weight, maximum fruit body weight of 15 g was recorded in strain AVT-16-01 and AVT-16-05.

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

<i>A. bisporus</i> strain	Pantnagar		Ludhiana		Murthal		Pune		Solan		Nauni		Palampur		Samastipur		Average	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
AVT-16-01	19	18	28	15	22	15	22	16	24	14	24	12	21	13	30	14	24	15
AVT-16-02	--	--	25	15	21	14	22	18	22	14	22	11	21	12	31	14	23	14
AVT-16-03	17	17	25	18	20	13	21	17	26	14	21	12	21	13	32	12	23	14
AVT-16-04	15	16	26	16	17	12	20	14	24	15	22	12	21	13	32	14	22	14
AVT-16-05	19	17	27	16	18	13	21	18	24	15	23	11	21	12	32	14	23	15

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

The compost parameters recorded at various centres have indicated that the pH of the compost ranged from 7.1 to 7.7 while nitrogen percent was varied from 1.8 to 2.6. The moisture percent varied from 58- 68% (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	7.6	2.0	61	Dark brown
Pantnagar	7.1	1.9	66	Dark brown
Murthal	7.4	2.0	64	Dark brown
Ludhiana	7.4	2.6	67	Dark brown
Nauni	7.2	2.2	63	Dark brown
Solan	7.7	2.1	58	Dark brown
Palampur	7.6	1.8	68	Dark brown

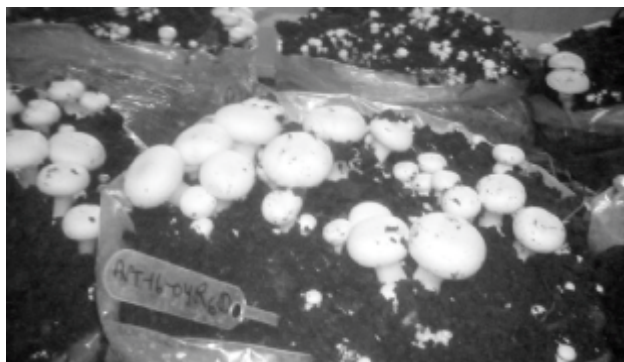


Fig 4.1. Button mushroom strain AVT-16-03 at Pantnagar Centre

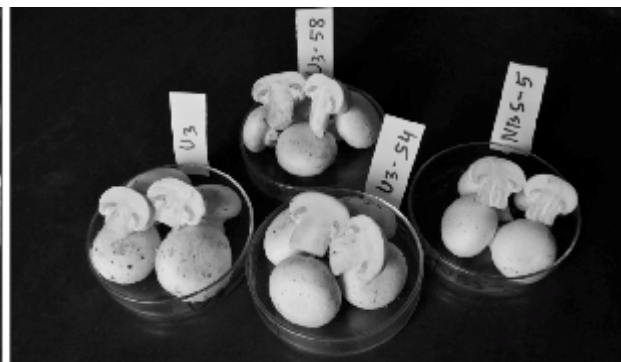


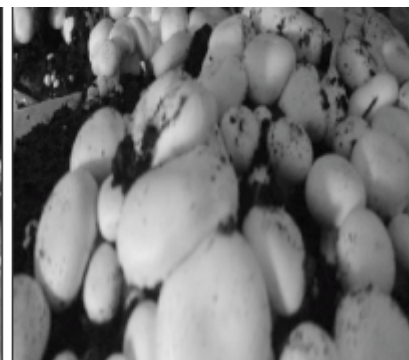
Fig 4.2. Button mushroom strains grown at Pusa centre



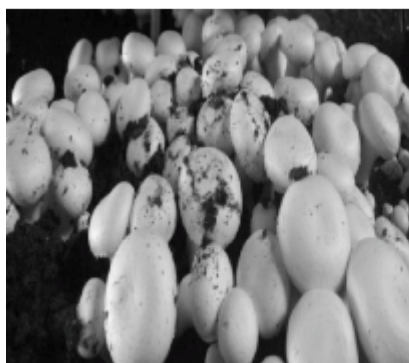
AVT-16-01



AVT-16-02



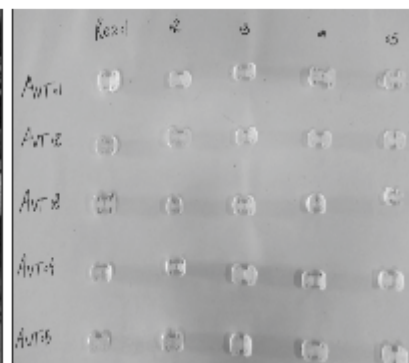
AVT-16-03



AVT-16-01



AVT-16-02



AVT-16-03

Fig 4.3. AVT crop at Murthal Centre

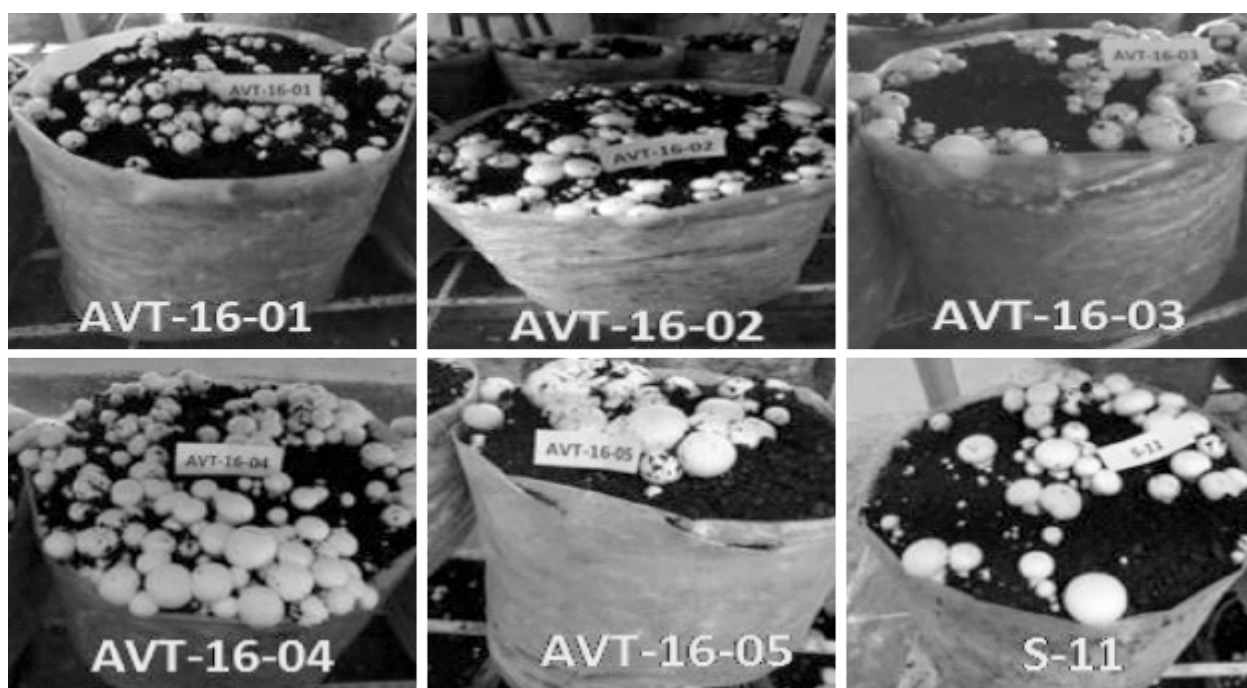


Fig 4.4. AVT crop at Pune Centre

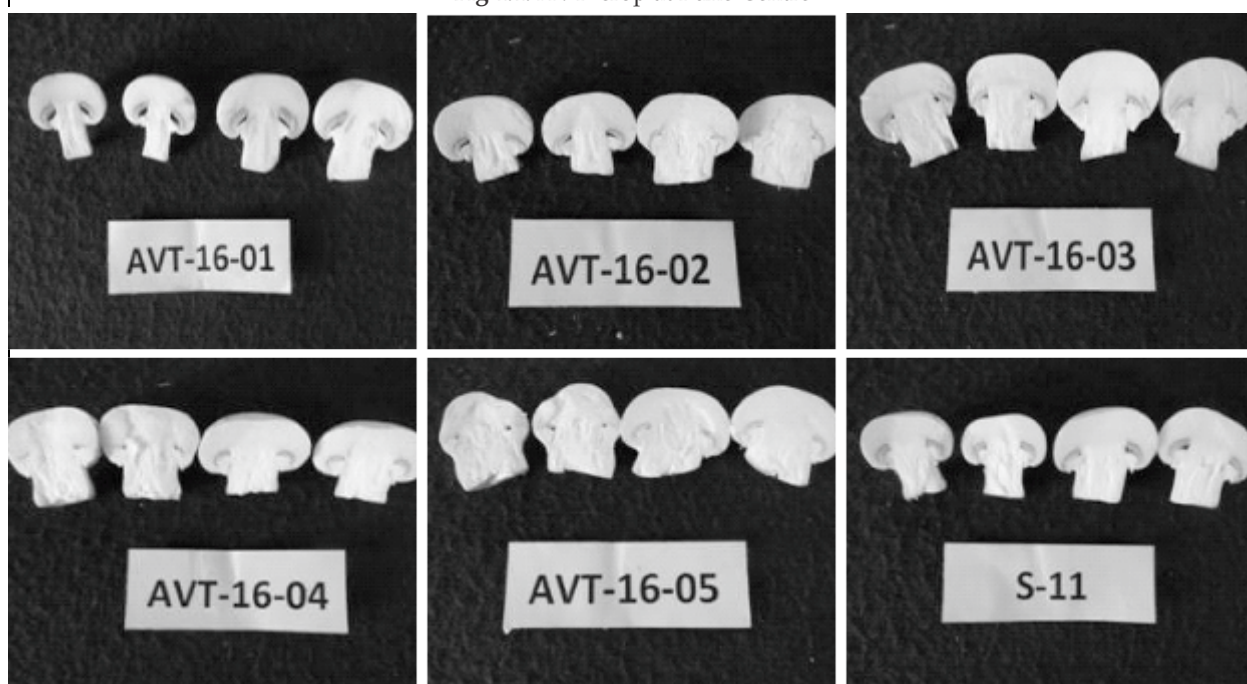


Fig 4.5. Cross section of button mushroom strain at Pune Centre



Fig 4.6. AVT crop at Nauni Centre



Fig 4.8. AVT crop at Ludhiana Centre

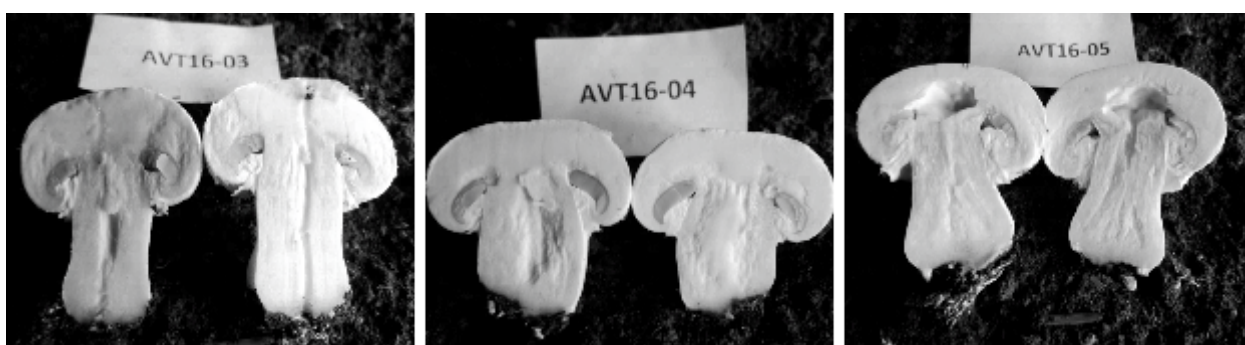


Fig 4.9. Cross section of button mushroom strain at Ludhiana Centre



Fig 4.10. AVT crop at Palampur Centre and cross section of fruit bodies

1.2 Advanced varietal trial-1 for strains of Paddy Straw Mushroom, *Volvariella volvacea*

The trial was assigned at six centres and a total of six strains of *Volvariella volvacea* were tested. Out of six centres only four could report successful results. At Ranchi and Raipur centre, the trials could not be laid because of late receipt of culture and low temperature. The biological efficiency of various strains varied in the range of 1.17 to 17.70 kg /100 kg of dry substrate at various centres in different strains. The maximum yield of 17.70 kg/100 kg of dry

substrate was recorded in strain Vv-16-06 at Ludhiana followed by Vv-16-02 strain (17.27 kg/100kg dry straw) in Coimbatore and Vv-16-03 at Ludhiana centre. It was also recorded that the all the test strains performed well with good biological efficiency at the Bhubaneswar centre. The minimum biological efficiency of 1.17 kg/100 kg dry straw was recorded in Vv-16-06 at Coimbatore centre. Overall average showed that the maximum BE (14.89 kg) was recorded in Vv-16-02 strain while the minimum BE (9.19 kg) was in strain Vv-16-05 (Table 4.5).

Table 4.4. Yield of different strains of Paddy Straw Mushroom, *Volvariella volvacea* (kg/100kg of dry substrate)

Strain	Coimbatore	Ludhiana	Bhubaneswar	Hisar	Average
Vv-16-01	5.60	--	9.27	12.7	9.19
Vv-16-02	17.27	13.86	14.23	14.2	14.89
Vv-16-03	2.80	16.65	16.15	11.3	11.72
Vv-16-04	3.81	12.15	14.06	12.3	10.58
Vv-16-05	3.03	6.82	12.44	15.3	9.40
Vv-16-06	1.17	17.70	16.28	12.7	11.96
CD(0.05)	1.05	1.40	2.84	1.68	

The average fruit body weight varied at different centres with a maximum of 27.55 g at Coimbatore centre in the strain Vv-16-02 while the minimum fruit body weight was recorded to be 3.65 g at Bhubaneswar centre in the strain Vv-16-06. All the strains have recorded the maximum fruit body weight at Coimbatore centre followed by Ludhiana centre. Overall average showed that the maximum fruit body

weight (14.61 g) was recorded in strain Vv-16-02 while minimum (10.63 g) in Vv-16-05 strain.

The minimum time taken for the first harvest was 10 days in strain Vv-16-03 at Ludhiana centre. The overall average indicated the minimum time taken for the first harvest was in strain Vv-16-02 while the maximum time in strain Vv-16-05 (Table 4.6).

Table 4.5. Average fruit body weight (g) and time taken to first harvest in strains of paddy straw mushroom

Strain	Coimbatore		Ludhiana		Bhubaneswar		Hisar		Average	
	a	b	a	b	a	b	a	b	a	b
Vv-16-01	19.06	12.11	--	--	4.44	14.67	12.3	18.3	11.93	15.03
Vv-16-02	27.55	12.00	12.8	11	5.09	13.11	13.0	19.7	14.61	13.95
Vv-16-03	10.16	18.67	18.3	10	5.63	12.61	15.3	21.7	12.35	15.75
Vv-16-04	12.02	16.50	13.1	13	3.89	11.78	14.8	20.5	10.95	15.45
Vv-16-05	9.58	18.17	10.3	17	4.24	12.22	18.4	19.8	10.63	16.80
Vv-16-06	9.30	17.56	17.3	11	3.65	12.39	15.3	20.2	11.39	15.29

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

**Fig. 4.11.** Paddy straw mushroom AVT Trials at Coimbatore Centre



Fig. 4.12. Paddy straw mushroom AVT Trials at Bhubaneswar Centre



Fig. 4.13. Paddy straw mushroom AVT Trials and cross section of fruit bodies at Ludhiana Centre

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

This trial was conducted at 22 different centres. A total of four high yielding strains of *Pleurotus*

were under evaluation trial (Table 4.6). All the strains under testing gave maximum biological efficiency at Pune centre with a maximum BE ranging between 83-98 kg/100 kg

of dry straw. However, the maximum BE was recorded to be 106% at Portblair centre in PI-16-03 strain. Also the lowest BE of 20.74 % was recorded at Manipur centre in the strain PI-16-

03 itself. Overall average showed maximum average BE of 66.07 kg/100 kg straw in PL-16-02 strain.

Table 4.6. Strain evaluation of oyster mushroom species (yield kg/100kg dry substrate)

Location	Strains				
	PI-16-01	PI-16-02	PI-16-03	PI-16-04	CD (5%)
Bangalore	38.83	31.13	30.70	2.93	3.26
Barapani	49.69	51.92	46.44	42.08	1.24
Bhubneswar	65.31	72.40	62.60	70.31	1.76
Coimbatore	91.60	89.47	86.94	87.16	2.31
Hisar	57.51	48.34	57.75	59.84	1.29
Jammu	77.32	83.88	79.57	66.56	1.99
Kalyani	40.50	38.54	26.11	45.25	0.97
Manipur	30.65	37.13	20.74	35.06	0.80
Mizoram	30.14	35.75	22.34	34.24	0.79
Pantnagar	74.94	78.52	39.4	60.94	1.02
Pasighat	38.4	-	-	51.9	2.54
Pune	91.34	93.54	83.19	98.16	2.38
Pusa	73.25	80.35	77.75	80.75	2.62
Raipur	84.64	90.16	87.96	86.48	2.54
Ranchi	73.33	68.75	85.24	67.01	9.92
Srinagar	72.62	77.33	67.00	89.56	3.64
Udaipur	64.78	48.79	76.12	87.97	1.49
Vellayani	26.28	72.28	55.58	34.90	9.40
Jorhat	90.10	79.05	76.44	83.38	5.70
Meerut	72.00	69.00	64.00	58.00	4.62
Portblair	87.25	66.25	106.00	52.50	9.86
VPKAS, Almora	64.10	74.90	88.30	83.52	5.32
Average	63.39	66.07	63.82	63.93	

The minimum time taken for the first harvest was recorded as 13 and 14 days at Portblair centre while maximum first harvest time of more than 48 days was recorded at Udaipur centre in PI-16-03 strain. Also Maximum first harvest time was recorded at Udaipur centre in

all the strains tested (table 4.7). Maximum fruit body weight of 34.6 g was recorded in strain PI-16-03 at Bhubaneshwar centre while the lowest Fruit body weight of 3.99g at Manipur centre in PI-16-03 strain (Table 4.8).

Table 4.7. Time taken for first harvest in different strains of *Pleurotus* (in days)

Location	Strains			
	PI-16-01	PI-16-02	PI-16-03	PI-16-04
Bangalore	20.00	19.00	22.00	22.00
Barapani	21.66	20.17	21.74	31.67
Bhubneswar	28.96	28.90	28.75	29.40
Coimbatore	21.63	21.90	22.13	22.21
Hisar	28.88	28.30	29.40	30.60
Jammu	20.44	19.67	37.63	39.13
Manipur	29.63	27.17	31.96	31.33

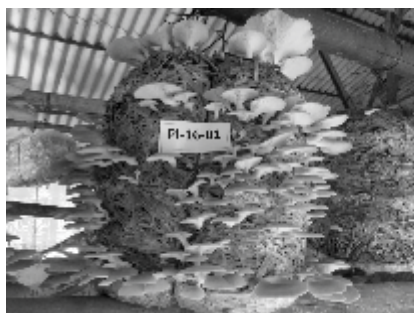


Fig. 4.20. Oyster mushroom crop at Bhubaneswar centre



Fig. 4.21. Fruitbody quality at Udaipur

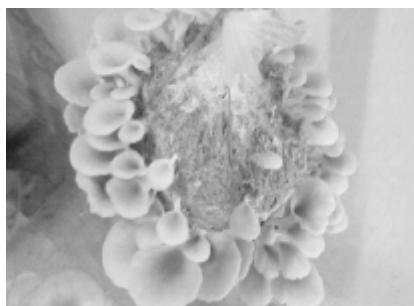


Fig. 4.22. Crop at Kalyani centre



Fig. 4.23. Crop at Manipur centre



Fig. 4.24. Crop at at Mizoram centre



Fig. 4.28. Crop at Pune centre



Fig. 4.29. Crop at Sikkim centre



Fig. 4.30. Crop at Ranchi centre



Fig. 4.31. Crop at Srinagar centre



Fig. 4.32. Crop at Udaipur centre



Fig. 4.33. Crop at Nagaland centre

1.4 Advanced varietal trail for high yielding strains of milky mushroom

This trial was allotted to eleven different Centres and five strains of milky mushroom were to be evaluated. But due to late receipt of the cultures and low temperature, all the

centres could not complete the experiment. Some centres where the temperature was suitable, the experiment was carried out. But where the temperature was not suitable, the experiment is ongoing. Till now five centres have completed the experiment and reported

Mizoram	29.21	26.40	31.67	31.08
Pantnagar	18.00	13.00	28.00	22.00
Pasighat	33.00	-	-	37.00
Pune	27.06	26.15	26.10	25.02
Pusa	28.07	26.93	27.17	27.80
Srinagar	34.54	32.28	37.54	29.82
Udaipur	42.00	43.00	48.00	44.00
Vellayani	27.00	27.00	25.00	27.00
Meerut	16.00	16.00	18.00	18.00
Portblair	13.00	14.00	14.00	17.75
VPKAS, Almora	17.00	17.00	20.00	19.00
Average	25.34	23.93	27.59	28.05

Table 4.8. Average fruit body weight in different strains of *Pleurotus* (in g)

Location	Strains			
	PI-16-01	PI-16-02	PI-16-03	PI-16-04
Bhubneswar	28.2	33.3	34.6	34.5
Coimbatore	21.14	23.62	34.45	39.63
Jammu	9.24	9.37	9.15	8.33
Kalyani	6.05	6.06	6.31	6.05
Manipur	5.37	4.96	3.99	8.72
Mizoram	5.38	4.61	4.37	8.37
Pantnagar	8.77	6.91	7.12	7.56
Pune	8.38	11.13	9.01	7.67
Ranchi	5.08	5.88	6.14	6.49
Srinagar	17.24	10.82	17.34	21.44
Udaipur	6.69	5.56	7.49	8.14
Jorhat	7.90	11.17	8.44	7.41
Meerut	7.20	6.90	8.00	9.67
VPKAS, Almora	10.90	5.60	5.39	4.11
Average	10.54	10.42	11.56	12.72



Fig. 4.14. Crop at Coimbatore centre



Fig. 4.15. Crop at Jammu centre



Fig 4.16. Fruitbody quality at Barapani



Fig. 4.17. Crop at Bangalore

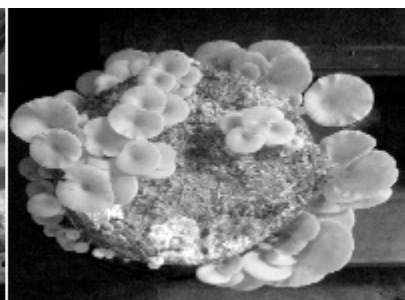


Fig. 4.18. Crop at Pusa centre



Fig. 4.19. Crop at Vellayani centre

the results. Amongst these centres, the maximum yield of 104 kg/ 100 kg straw was obtained at the Coimbatore centre in CI-16-03 strain followed by CI-16-01 strain (79.17 kg/100 kg straw) at Pantnagar centre. Minimum yield of 6.38 kg/ 100 kg straw was obtained in CI-16-02 strain at Pantnagar centre. Overall average showed that CI-16-03 performed the best amongst the strains tested with overall average of 57.57 kg per 100 kg dry substrate.

The minimum days taken for first harvest (22 days) was observed in the strain CI-16-01 at Murthal centre while maximum days taken for first harvest (46.76 days) in strain CI-16-04 at Hisar Centre. Overall average showed that the minimum time taken for first harvest was in CI-16-01 while maximum time taken in the strain CI-16-04. The maximum fruitbody weight (54.6 g) was observed in strain CI-16-04 at Coimbatore centre while a minimum fruit body weight of 9.4 g was recorded in CI-16-04 strain at Murthal centre.

Table 4.9. Advanced varietal trial for high yielding strains of milky mushroom (kg/100 kg dry sub)

Centres	Strains					CD (0.05)
	CI-16-01	CI-16-02	CI-16-03	CI-16-04	CI-16-05	
Coimbatore	44.30	35.10	104.80	55.80	38.50	8.56
Hisar	40.94	53.45	42.65	45.19	41.81	4.12
Pantnagar	79.17	6.38	55.38	39.5	59.38	4.48
Vellayani	35.00	24.00	41.00	70.00	46.00	6.90
Murthal	56.00	49.00	44.00	35.00	40.00	1.60
Average	51.08	33.59	57.57	49.10	45.14	

Table 4.10. Day taken to first harvest and average fruit body weight in high yielding strains of milky mushroom

Centres	CI-16-01		CI-16-02		CI-16-03		CI-16-04		CI-16-05	
	a	b	a	b	a	b	a	b	a	b
Coimbatore	27.30	36.30	28.00	38.10	24.08	54.60	27.61	42.30	28.00	32.10
Hisar	44.88	-	46.45	-	45.70	-	46.76	-	44.94	-
Pantnagar	-	26.10	-	13.91	-	16.17	-	27.72	-	38.10
Vellayani	36	-	36	-	35	-	35	-	35	-
Murthal	22	30	25	23	29	16.5	33	9.4	30	12.5
Average	32.55	30.80	33.86	25.00	33.45	29.09	35.59	26.47	34.49	27.57

a: Time taken to first harvest; b: Average fruit body weight



Fig. 4.34. Strain evaluation trial of milky mushroom at Coimbatore centre.



Fig. 4.35. Milky mushroom trial at Pantnagar centre



Fig. 4.36. Milky mushroom trial at Vellayani centre



Fig. 4.37. Milky mushroom trial at Vellayani centre



Fig. 4.38. Milky mushroom trial at Meerut centre



Fig. 4.39. Strain CI-16-01 at Murthal centre



Fig. 4.40. Strain CI-16-02 at Murthal centre



Fig. 4.41. Strain CI-16-03 at Murthal centre



Fig. 4.42. Strain CI-16-04 at Murthal centre



Fig. 4.43. Strain CI-16-05 at Murthal centre

1.5 Initial Varietal trial of Shiitake mushroom

This trial was allotted to nine different centres and four strains of shiitake mushroom (LE-16-01, LE-16-04, LE-16-05 and LE-16-06) were to be evaluated. The evaluation was to be done on

two substrates i.e. saw dust and wheat straw. A total of three centres have reported successful results of the experiment. At rest of the six centres the experiment is ongoing and results could not be reported. The maximum biological

efficiency of 218 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in LE-16-06 while the same strain showed a lower BE of 32 kg / 100 kg of dry substrate on wheat straw based substrate. Strain LE-16-01 also gave high BE of 130 kg/100 kg of dry saw dust substrate at the same centre. Highest biological efficiency on wheat straw substrate was recorded to be 92.00 kg /100 kg substrate at murthal centre itself. Lowest BE was of 1.60 kg / 100 kg of dry substrate was also recorded at Murthal centre in the strain LE-16-05 on wheat straw based substrate. Overall average biological efficiency showed that the strain LE-16-04 performed the best on wheat

straw substrate while LE-16-06 performed best on saw dust substrate.

It was observed that days taken to first harvest in saw dust substrate was higher in all the strain in comparison to wheat straw based substrate. The maximum time taken to first harvest was 130 days in LE-16-06 at Bangalore centre while minimum first harvest time of 65 days in saw dust substrate was recorded in strain LE-16-05 at Murthal centre. In wheat straw based substrate minimum time to first harvest was recorded as 61 days at Murthal centre while maximum time of 78 days was also recorded at Murthal centre itself in strain LE-16-06.

Table 4.11. Initial varietal trail for shiitake mushroom (kg/100 kg dry sub)

Centres	Strains									
	LE-16-01		LE -16-04		LE -16-05		LE -16-06		CD (0.05)	
	a	b	a	b	a	b	a	b	a	b
Murthal	130.00	48.00	57.60	92.00	108.00	1.60	218.00	32.00	5.72	2.12
Bangalore	--	--	2.14	--	8.425	--	5.60	--	--	--
Hisar	14.6	--	20.2	--	12.1	--	11.5	--	1.26	--
Average	72.30	48.00	26.65	92.00	42.84	1.60	78.37	32.00		

a: Saw dust substrate; b : wheat straw substrate

Table 4.12. Day taken to first harvest in high yielding strains of shiitake mushroom

Centres	Strains							
	LE-16-01		LE -16-04		LE -16-05		LE -16-06	
	a	b	a	b	a	b	a	b
Murthal	71	61	77	67	65	68	75	78
Bangalore	102	-	110	-	109	-	130	-
Hisar	74.35	-	66.35	-	82.57	-	82.80	-
Average	82.45	61.00	84.45	67.00	85.52	68.00	95.93	78.00

a: Saw dust substrate; b : wheat straw substrate

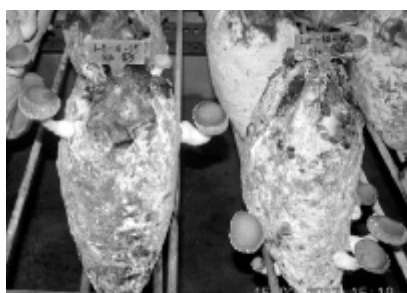


Fig. 4.44. Shiitake strain evaluation at IIHR, Bangalore



Fig. 4.44. Crop of LE-16-01 on saw dust in Murthal

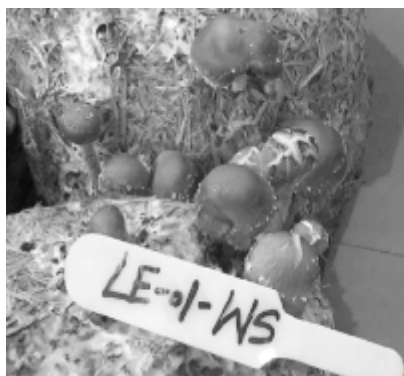


Fig. 4.45. Crop of LE-16-01 on wheat straw at Murthal

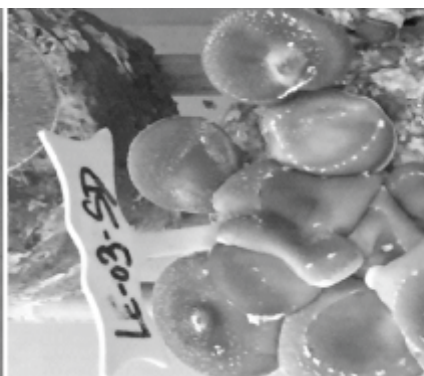


Fig. 4.46. Crop of LE-16-05 on saw dust at Murthal



Fig. 4.47. Crop of LE-16-06 on wheat straw at Murthal

2. CROP PRODUCTION

2.1 Use of spent button mushroom substrate for button mushroom compost production (1st Trial)

The trial was assigned to three different centres i.e. Murthal, Ludhiana and Pune. A new initiative to use spent button mushroom compost in the preparation of fresh compost was developed at DMR, Solan, which offers effective use of spent mushroom substrate and do not create environment pollution. At Murthal centre, the experiment couldn't be carried out due to non-availability of spent mushroom substrate while at Pune centre, the experiment is under progress and results are awaited. The only one centre reported successful results of the experiment are Ludhiana Centre (Table 4.12). Two strains namely, S-11 and U-3 of button mushroom were used for the experiment. The compost formulae used in given in Table 4.12.

Table. 4.12. Compost formulae used

Ingredients	Quantity (kg)		
	I	II	III
Wheat straw	1000	800	800
Poultry manure	700	390	560
Wheat bran	150	120	120
Urea	15	12	12
Gypsum	35	35	35
SMS	-	445	445

Table 4.13. Analysis of composite compost sample (dry weight basis)

Parameter	Value		
	I	II	III
Moisture (%)	67-69	65-69	67-69
pH	7.5	7.2	7.0
N (%)	2.4	1.8	1.9
C/N ratio	23 :1	19 :1	20 :1
Conversion ratio	1:2.1	1 :1.7	1 :1.8

Agaricus bisporus strains U3 and S11 were grown on wheat straw and spent mushroom substrate based compost. Four replicates each with ten bags for each compost formula were laid in random block design (RBD) to accommodate 240 bags. Beds were cased after 17-19d for U3 and 19-24d for S11 of spawning. Pinheads appeared in 22-26d for U3 and 23-27d for S11 after casing. The first crop was harvested between 24-29d for U3 and 25-30d for S11 after casing and lasted for 4 weeks. The yield data indicated maximum yield for the compost formula no. I (15.55 kg/q compost for U3 and 12.30 kg/q compost for S11).

Table 4.14. Evaluation of SMS based compost for cultivation of button mushroom, *Agaricus bisporus*

Compost Formula No.	First harvest after casing (d)	Yield (kg/100 kg compost)	Av. wt. of a FB (g)	Disease/Pest incidence
Strain U3				
I	24	15.55	16.0	-
II	28	10.60	14.8	-
III	29	10.90	15.2	-
CD (5%)		0.80		
Strain S11				
I	25	12.30	12.8	-
II	28	8.65	11.0	-
III	30	7.23	9.8	+
CD (5%)		1.14		

**Fig. 4.48.** Evaluation of SMS based compost for cultivation of button mushroom, *Agaricus bisporus* at Ludhiana centre

3. CROP PROTECTION

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

No one has performed this experiment due to spread of the disease in their farm.

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 378 collections have been made and a total of 200 specimens/cultures were deposited at the DMR Gene Bank with passport

data and accession numbers were given to 136 cultures. Rest of the cultures were contaminated. 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 specimens Collected	No. of specimens deposited	Accession No obtained
PAU, Ludhiana	12	12	12
TNAU, Coimbatore	06	06	06
MPKV, Pune	109	38	32
GBPUA&T, Pantnagar	39	08	08
IGKVV, Raipur	29	0	0
MPUAT, Udaipur	29	16	15
KAU, Kerala	11	11	11
HAU, Hisar	0	0	0
OUAT, Bhubneshwar	17	17	12
RAU, Samastipur	3	3	0
CAU Pasighat	14	14	3
HAIC, Murthal	0	0	0
HPKV, Palampur*	-	-	-
ICAR RC NEH Region, Barapani	0	0	0
ICAR RC, Sikkim	2	2	2
ICAR RC, Arunachal Pradesh	0	0	0
ICAR RC, Nagaland	15	0	0
ICAR RC, Mizoram	0	0	0
ICAR RC, Tripura	3	3	3
ICAR RC, Manipur	5	5	0
ICAR-RC ER, Ranchi, Jharkhand	2	0	0
ICAR-CARI, Port Blair	0	0	0
IIHR, Bangalore	0	0	0
UHF, Nauni	16	16	3
VPKAS, Almora	3	0	0
SKUAST, Kashmir	8	0	0
SKUAST, Jammu	21	21	5
AU Assam	7	7	3

SVBP, Meerut	0	0	0
BCKVV, Kalyani	6	0	0
DAU, Gujrat	0	0	0
ANGRAU, Hyderabad	0	0	0
ICAR-DMR, Solan	21	21	21
Total	378	200	136

Solan Centre

Fungal forays were undertaken in the forest areas of Himachal Pradesh and Tripura states. A total number of 27 specimens were collected and 21 were identified up to genus level. All the specimens have been preserved in the herbarium of ICAR-DMR, Solan and examined for their macroscopic feature in the field along with their photographs. Pure tissue cultures of 21 specimens were obtained and deposited in the Gene bank of DMR, Solan. Some of the

interesting specimens include *Lepista* sp., *Leucocoprinus* sp., *Gymnopilus* sp., *Laccaria* sp., and *Austroboletus* sp., etc.

Ludhiana Centre

Wild mushroom flora was surveyed in the districts of Punjab during the months from July to September, 2016. A total of 12 mushrooms were collected and submitted to ICAR-DMR Culture bank accessioned as DMRO-905 to DMRO-916 (Fig 5.1).



Fig 5.1. Wild collections by PAU Ludhiana

Coimbatore Centre

During 2016-17, a total number of six wild mushroom specimens have been collected,

identified and pure cultured. The cultures, dried specimen along with spore prints of six cultures have been sent to the National

Repository at DMR, Solan on 17.03.17 along with passport data. During the III week of March 2017, a wild edible milky mushroom specimen, which weighed 13 kg was collected

from a banana field near Sirumugai, Coimbatore district. Spore prints, dried specimen and pure culture have been made.



Fig 5.2. Wild collections by TNAU, Coimbatore

Pune Centre

Survey for collection of wild edible mushroom for exploring the possibilities of selection of promising strain, if any, from different forests of Western Maharashtra was undertaken during monsoon of the year 2016-17. 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 work, in all 109 samples were collected and identified on the basis of mycological characters (Table 1.1). Among the identified samples some species belongs to genera viz. *Pleurotus* sp., *Tricholoma* sp., *Agaricus* sp., *Termitomyces* sp., *Polyporus* sp., *Clitocybe* sp. etc. The tissue isolation of the collected samples was done and in all 38 pure cultures of mushroom were successfully derived and maintained.

The pure cultures along with identification proforma sheets, spore prints, dry fruit sample and cultures were deposited in Gene bank of DMR, Chambaghat, Solan (HP). Out of 38 cultures deposited, in all 32 cultures received the accession numbers to this centre.

Table 5.2. List of wild fleshy fungi collected during Monsoon 2016-17 by Pune Centre

Sr. No	Sample No.	DMR Accession No.	GPS data	Habitat	Cap Colour	Identification
1	PN-16-01	**	La-19°00'45"N Lo-73°43'48"E	Humus	Whitish chocolate	<i>Agaricus</i> sp.
2	PN-16-02	**	La-18°31'54"N Lo-73°50'40"E	Humus	Gray	<i>Lycoperdon</i> sp.
3	PN-16-03	**	La-18°31'58"N Lo-73°50'40"E	Humus	Gray brown	<i>Agrocybe</i> sp.

4	PN-16-04		La-18°31'59"N Lo-73°50'40"E	Humus	Creamy white	<i>Leucoagaricus</i> sp.
5	PN-16-05	**	La-18°31'54"N Lo-73°50'41"E	Humus	Gray	<i>Agrocybe</i> sp.
6	PN-16-06	**	La-18°31'56"N Lo-73°50'40"E	Sandy soil	Milky white	<i>Clitocybe</i> sp.
7	PN-16-07	**	La-18°32'30"N Lo-73°50'40"E	Sandy soil	Gray with black centre	<i>Agrocybe</i> sp.
8	PN-16-08	**	La-18°31'51"N Lo-73°50'41"E	Humus Humus	Gray with black centre	<i>Agaricus</i> sp.
9	PN-16-09	**	La-18°32'53"N Lo-73°49'35"E	Leaf litter	Blackish brown	<i>Agaricus</i> sp.
10	PN-16-10	DMRO-851	La-18°33'01"N Lo-73°49'37"E	Humus	Brown	<i>Agaricus augustus</i> .
11	PN-16-11	**	La-18°33'00"N Lo-73°49'34"E	Leaf litter	Chocolate	<i>Lycoperdon</i> sp.
12	PN-16-12	**	La-18°33'03"N Lo-73°49'33"E	Humus	Gray	<i>Inocybe</i> sp.
13	PN-16-13	**	La-18°32'58"N Lo-73°49'31"E	Leaf litter	White with brown scales	<i>Leucoagaricus</i> sp.
14	PN-16-14	**	La-18°32'58"N Lo-73°49'31"E	Leaf litter	White with brown scales	<i>Leucoagaricus</i> sp.
15	PN-16-15	**	La-18°33'07"N Lo-73°49'29"E	Tree trunk	Gray	<i>Pleurotus</i> sp.
16	PN-16-16	DMRO-852	La-18°32'01"N Lo-73°50'40"E	Dung	Creamy white	<i>Bovista plumbea</i>
17	PN-16-17	DMRO-853	La-18°32'07"N Lo-73°50'28"E	Humus	Grayish with black center	<i>Tricholoma</i> sp.
18	PN-16-18	**	La-18°32'30"N Lo-73°50'39"E	Leaf litter	Creamy to pink	Un identified
19	PN-16-19	DMRO-854	La-18°28'57"N Lo-73°30'17"E	Leaf litter	Creamy white	<i>Agaricus</i> sp.
20	PN-16-20	**	La-18°28'07"N Lo-73°27'49"E	Humus	Chocolate/ brown	<i>Tricholoma</i> sp.
21	PN-16-21		La-18°28'89"N Lo-73°26'26"E	Leaf litter	Yellowish red	<i>Chlorophyllum</i> sp.
22	PN-16-22	**	La-18°32'30"N Lo-73°50'40"E	Humus	Gray with black centre	<i>Entoloma</i> sp.
23	PN-16-23	**	La-18°32'30"N Lo-73°50'43"E	Humus	Gray with dark black centre	<i>Bolbitius</i> sp.
24	PN-16-24	**	La-18°27'11"N Lo-73°22'28"E	Humus	Creamy	<i>Tricholoma</i> sp.
25	PN-16-25	DMRO-855	La-18°24'11"N Lo-73°22'41"E	Humus	Brown	<i>Agaricus</i> sp.
26	PN-16-26	DMRO-856	La-18°18'52"N Lo-73°18'10"E	Humus	Creamy white	<i>Clitocybe</i> sp.

27	PN-16-27	**	La-18°15'57"N Lo-73°17'44 "E	Humus	Reddish brown	<i>Agaricus</i> sp.
28	PN-16-28	DMRO-857	La-18°13'55"N Lo-73°17'44 "E	Humus	Violet	<i>Hygrophorus</i> sp.
29	PN-16-29	DMRO-858	La-18°08'53"N Lo-73°19'21 "E	Humus	Creamy white	<i>Clitocybe</i> sp..
30	PN-16-30	**	La-18°04'32"N Lo-73°25'17 "E	Humus	Dark gray	<i>Agaricus</i> sp.
31	PN-16-31	DMRO-859	La-17°54'45"N Lo-73°23'29 "E	Humus	Gray white	<i>Agaricus</i> sp.
32	PN-16-32	**	La-18°04'41"N Lo-73°23'56"E	Humus	Blackish gray	<i>Volvariella</i> sp.
33	PN-16-33	**	La-18°04'28"N Lo-73°24'09"E	Wooden stump	Yellowish	<i>Polyporus</i> sp.
34	PN-16-34	DMRO-860	La-17°50'12"N Lo-73°24'24 "E	Base of banyan tree	Creamy gray with dark center	<i>Coltricia perennis</i>
35	PN-16-35	**	La-18°05'46"N Lo-73°27'15"E	Humus	Yellow	<i>Lycoperdon</i> sp.
36	PN-16-36	**	La-18°33'00"N Lo-73°49'26"E	Cow dung	Yellowish brown	<i>Leucoagaricus</i> sp.
37	PN-16-37	**	La-18°33'01"N Lo-73°49'27"E	Grass land	Yellowish	<i>Armillaria</i> sp.
38	PN-16-38	**	La-18°33'08"N Lo-73°49'20"E	Humus	Brick red	Unidentified
39	PN-16-39	**	La-18°33'09"N Lo-73°49'21"E	Soil	Creamy white	<i>Leucoagaricus</i> sp.
40	PN-16-40	**	La-17°37'07"N Lo-73°28'34 "E	Base of <i>Ficus</i> tree	Gray	<i>Tricholoma</i> sp.
41	PN-16-41	DMRO-861	La-17°32'17"N Lo-73°30'07 "E	Humus	Creamy White =	Unidentified
42	PN-16-42	DMRO-862	La-17°27'33"N Lo-73°31'18 "E	Humus	Gray	<i>Tricholoma</i> sp.
43	PN-16-43	**	La-16°51'36"N Lo-73°33'19"E	Humus	Egg white	<i>Bovista plumbea</i>
44	PN-16-44	**	La-16°51'13"N Lo-73°32'36"E	Humus	Chocolate Brown	<i>Tricholoma</i> sp.
45	PN-16-45	DMRO-863	La-16°39'49"N Lo-73°31'38 "E	Humus	Brown	<i>Agaricus</i> sp.
46	PN-16-46	**	La-17°02'56"N Lo-74°14'12"E	Humus	Yellow	<i>Coprinus</i> sp.
47	PN-16-47	**	La-16°41'15"N Lo-74°15'32"E	Humus	Chocolate brown	<i>Tricholoma</i> sp.
48	PN-16-48	DMRO-864	La-16°50'41"N Lo-74°18'09 "E	Soil	White with brown center	<i>Leucoagaricus</i> sp.
49	PN-16-49	DMRO-865	La-16°35'12"N Lo-74°11'23 "E	Humus	Creamy	<i>Leucoagaricus</i> sp.

50	PN-16-50	**	La-16°30'53"N Lo-74°08'23"E	Tree trunk	White	<i>Pleurotus</i> sp.
51	PN-16-51	**	La-16°28'28"N Lo-74°07'22"E	Tree trunk	Faint pink	<i>Pleurotus</i> sp.
52	PN-16-52	**	La-16°28'03"N Lo-74°07'20"E	Humus	Creamy White	<i>Leucoagaricus</i> sp.
53	PN-16-53	DMRO-866	La-16°15'10"N Lo-74°05'58"E	Tree trunk	Grayish creamy	<i>Hypsizygus</i> sp.
54	PN-16-54	DMRO-867	La-16°08'54"N Lo-73°58'37"E	Humus	Creamy white	<i>Leucoagaricus</i> sp.
55	PN-16-55	**	La-16°07'17"N Lo-73°58'04"E	Humus	White	<i>Termitomyces</i> sp.
56	PN-16-56	**	La-16°07'29"N Lo-73°57'52"E	Humus	White	<i>Collybia</i> sp.
57	PN-16-57	**	La-16°07'37"N Lo-73°57'56"E	Humus	Chocolate	<i>Collybia</i> sp.
58	PN-16-58	**	La-16°07'53"N Lo-73°58'02"E	Humus	Gray with brown center	Unidentified
59	PN-16-59	**	La-16°07'29"N Lo-73°57'52"E	Humus	Creamy	<i>Volvariella</i> sp.
60	PN-16-60	DMRO-868	La-16°08'39"N Lo-74°10'59"E	Tree trunk	Gray	<i>Pleurotus</i> sp.
61	PN-16-61	**	La-16°07'11"N Lo-74°08'42"E	wooden stump	Yellow	<i>Armillaria tabescens</i>
62	PN-16-62	**	La-15°72'11"N Lo-73°57'25"E	Tree trunk	Gray brown	<i>Conocybe</i> sp.
63	PN-16-63	**	La-15°58'10"N Lo-73°58'49"E	Leaf litter	White	<i>Lepiota</i> sp.
64	PN-16-64	**	La-15°57'11"N Lo-73°55'47"E	Humus	Grayish	<i>Termitomyces</i> sp.
65	PN-16-65	DMRO-869	La-15°58'16"N Lo-73°58'48"E	Soil	Orange	<i>Agaricus</i> sp.
66	PN-16-66	**	La-15°58'15"N Lo-73°58'47"E	Leaf litter	White	<i>Clitocybe</i> sp.
67	PN-16-67	**	La-16°08'17"N Lo-73°40'22"E	Coconut tree top	White	<i>Tricholoma</i> sp.
68	PN-16-68	**	La-16°10'17"N Lo-73°41'09"E	Tree trunk	Gray	<i>Pleurotus</i> sp.
69	PN-16-69	**	La-16°11'38"N Lo-73°42'02"E	Tree trunk	Gray	<i>Pleurotus</i> sp.
70	PN-16-70	**	La-16°47'23"N Lo-73°34'34"E	Wooden stump	White	<i>Clitocybe</i> sp.
71	PN-16-71	**	La-16°51'02"N Lo-73°32'45"E	Tree trunk	White	<i>Oudemansiella</i> sp.
72	PN-16-72	**	La-17°30'57"N Lo-73°30'32"E	Leaf litter	White with brown center	<i>Termitomyces haemeli</i>
73	PN-16-73	DMRO-870	La-18°56'47"N Lo-73°56'25"E	Humus	White	<i>Calocybe</i> sp.

74	PN-16-74	DMRO-871	La-18°56'46"N Lo-73°56'20"E	Leaf litter	Creamy white	<i>Clitocybe</i> sp.
75	PN-16-75	DMRO-872	La-18°57'03"N Lo-73°56'15"E	Leaf litter	White	<i>Inocybe</i> sp.
76	PN-16-76	DMRO-873	La-18°57'01"N Lo-73°56'36"E	Wooden stump	Brownish	Un identified
77	PN-16-77	DMRO-874	La-18°57'02"N Lo-73°56'13"E	Leaf litter	Creamy white	<i>Clitocybe</i> sp.
78	PN-16-78	DMRO-875	La-18°56'58"N Lo-73°56'11"E	Humus	Brown	<i>Agaricus</i> sp.
79	PN-16-79	DMRO-876	La-18°56'59"N Lo-73°56'20"E	Humus	White	<i>Coprinus</i> sp.
80	PN-16-80	DMRO-877	La-18°56'51"N Lo-73°56'20"E	Tree base	Yellowish brown	<i>Stropharia</i> sp
81	PN-16-81	DMRO-878	La-18°57'00"N Lo-73°56'22"E	Humus	Creamy white	Un identified
82	PN-16-82	DMRO-879	La-18°49'33"N Lo-73°52'35"E	Humus	Whitish brown	<i>Clitocybe</i> sp.
83	PN-16-83	DMRO-880	La-18°47'09"N Lo-73°52'18"E	Leaf litter	Whitish brown	<i>Clitocybe</i> sp.
84	PN-16-84	DMRO-881	La-18°46'13"N Lo-73°51'57"E	Sandy soil	Brown	<i>Agaricus</i> sp.
85	PN-16-85	**	La-18°33'48"N Lo-73°49'32"E	Leaf litter	Almond red	<i>Clitocybe</i> sp.
86	PN-16-86	**	La-18°33'49"N Lo-73°49'27"E	Leaf litter	Creamy	<i>Clitocybe</i> sp.
87	PN-16-87	**	La-18°33'52"N Lo-73°49'32"E	Leaf litter	Yellowish brown	<i>Hypholoma</i> sp.
88	PN-16-88	**	La-18°34'01"N Lo-73°49'30"E	Soil	Gray	<i>Tricholoma</i> sp.
89	PN-16-89	**	La-18°34'05"N Lo-73°49'29"E	Leaf litter	Gray	<i>Psilocybe</i> sp.
90	PN-16-90	**	La-18°33'57"N Lo-73°49'40"E	Wooden stump	Creamy	<i>Pleurotus</i> sp.
91	PN-16-91	**	La-18°44'55"N Lo-73°24'03"E	Tree base	White	<i>Hydnum</i> sp.
92	PN-16-92	**	La-18°44'18"N Lo-73°24'43"E	Tree base	Almond	Un identified
93	PN-16-93	**	La-18°44'23"N Lo-73°24'03"E	Soil	Bricks red	<i>Scleroderma</i> sp.
94	PN-16-94	**	La-18°44'21"N Lo-73°25'49"E	Leaf litter	Creamy	<i>Clitocybe</i> sp.
95	PN-16-95	**	La-18°45'37"N Lo-73°28'40"E	Tree trunk	Reddish	<i>Pseudoarmillariella</i> sp.
96	PN-16-96	**	La-18°45'46"N Lo-73°28'52"E	Leaf litter	White	<i>Clavaria</i> sp.

97	PN-16-97	**	La-18°45'39"N Lo-73°28'28"E	Leaf litter	Gray with black center	<i>Agaricus sp.</i>
98	PN-16-98	**	La-18°45'35"N Lo-73°30'26"E	Leaf litter	Almond	<i>Leucoagaricus sp.</i>
99	PN-16-99	**	La-18°46'01"N Lo-73°30'14"E	Leaf litter	Dark red	<i>Hygrocybe sp.</i>
100	PN-16-100	**	La-18°45'17"N Lo-73°31'32"E	Leaf litter	Almond	<i>Polyporus sp.</i>
101	PN-16-101	**	La-18°45'14"N Lo-73°31'26"E	Soil	Light orange	<i>Cortinarius sp.</i>
102	PN-16-102	**	La-18°45'37"N Lo-73°33'55"E	Leaf litter	Creamy	<i>Lepiota sp.</i>
103	PN-16-103	**	La-18°45'24"N Lo-73°34'47"E	Humus	Creamy	<i>Marasmius sp.</i>
104	PN-16-104	**	La-18°45'31"N Lo-73°35'32"E	Soil	Gray	<i>Tricholoma sp.</i>
105	PN-16-105	**	La-18°42'34"N Lo-73°40'51"E	Leaf litter	Creamy	<i>Lepiota sp.</i>
106	PN-16-106	**	La-18°42'34"N Lo-73°40'54"E	Leaf litter	White	<i>Clitocybe sp.</i>
107	PN-16-107	**	La-18°32'26"N Lo-73°50'32"E	Leaf litter	Almond	<i>Clitocybe sp.</i>
108	PN-16-108	**	La-18°32'26"N Lo-73°50'30"E	Leaf litter	Creamy brown	<i>Gymnopus sp.</i>
109	PN-16-109	**	La-18°32'26"N Lo-73°50'28"E	Base of tree trunk	Creamy white	<i>Clitocybe sp.</i>

** Pure culture not obtained *unidentified

Total no. of wild fleshy fungi collected

= 109

No. of wild fleshy fungi cultures sent to DMR, Solan

= 38

No. of wild fleshy fungi cultures obtained DMR Accession codes

= 32

Pleurotus sp.



PN-16-15



PN-16-50



PN-16-51



PN-16-60 (DMRO-868)

Tricholoma sp.



PN-16-17 (DMRO-853)



PN-16-20



PN-16-24



PN-16-40

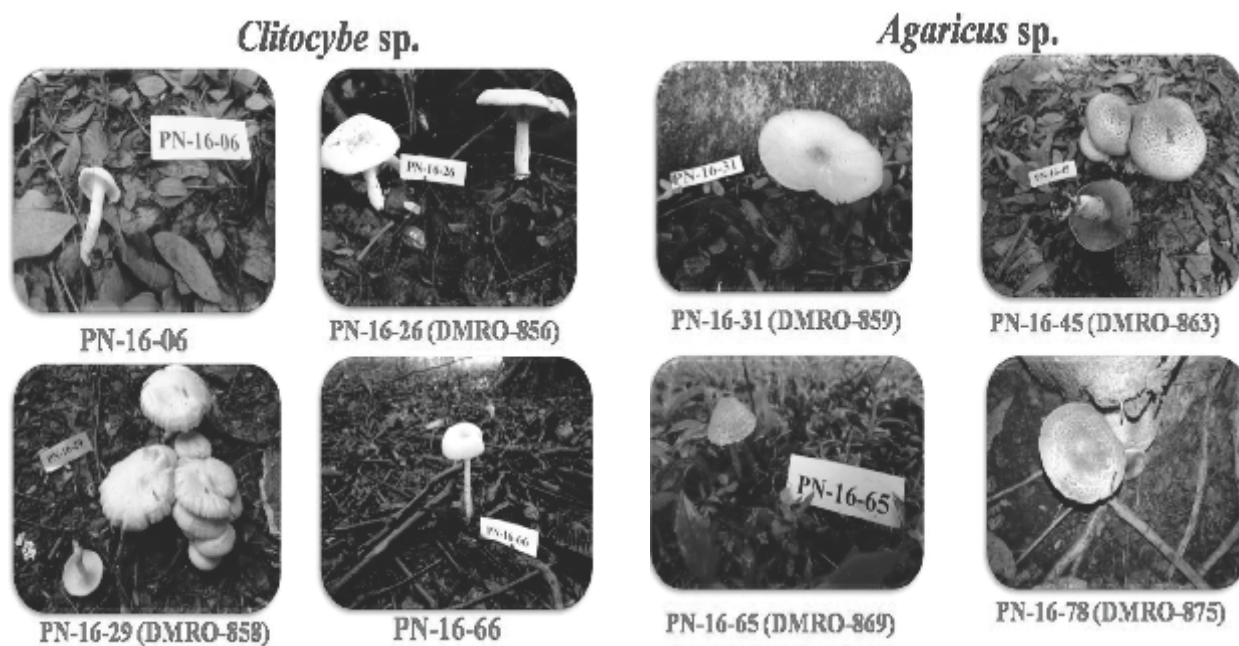


Fig. 5.3. Wild mushroom germplasm collected at Pune centre

Pantnagar Centre

During Rainy Season (July-Sept, 2016), Ramnagar, Dhumakot, Kalsi & Chakrata (Deharadun), Khatima, Gularbhoj, and adjacent forest area were surveyed and a total of

51 specimens were collected during season. Out of 51 wild specimens collected, 39 specimens were submitted to ICAR-DMR culture bank and 8 specimens were given ICAR-DMR accession numbers.





Fig 5.4. Mushroom germplasm collected by Pantnagar centre

Table. 5.3. List of accessions number allotted

Sl. No.	Acc. No.	Sample No.	Species	Cultivation Name	Allotment date
1.	DMRO-927	Pant 12/16	<i>Lepiota</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
2.	DMRO-928	Pant 13/16	<i>Ganoderma</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
3.	DMRO-929	Pant 17/16	<i>Lentinus</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
4.	DMRO-930	Pant 22/16	<i>Termitomyces</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
5.	DMRO-931	Pant 28/16	<i>Pleurotus</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
6.	DMRO-932	Pant 41/16	<i>Boletus</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
7.	DMRO-933	Pant 03/16	<i>Pleurotus</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017
8.	DMRO-934	Pant 11/16	<i>Pleurotus</i> sp.	Dr Kushwaha, and Dr Mishra	25.02.2017

Extensive surveys of fleshy fungi were conducted in various location of Chhattisgarh including forest area and local market. The mushrooms were collected from different habitat like forest rotten straw heaps, decaying wood etc. The fungi were also collected from local markets of Raipur, Kanker Gariyaband, Jagdalpur, Jashpur. 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. Both microscopic and macroscopic characters were recorded with due care.

The collected samples were preserved in 4% formalin solution Spore print and dried samples of have also been preserved. The detailed information regarding the wealth of edible macro-fungi in Chhattisgarh has been documented and is given below.

**Fig 5.5.** *Termitomyces* collected from Raipur Market. Market price Rs.600 - 800





Fig 5.6. Mushroom germplasm collected by Raipur centre

Table 5.4. List of wild fleshy fungi collected during Monsoon 2016-17 by Raipur Centre

Sample No.	GPS Data			Habitat	Cap Colour
	Longitude	Latitude	Altitude		
IGKV-VV- 01	81°33'2.736" E	21°2'10.86"N	300 m	Humus/Paddy Straw	Light Brown (Centre Brown)
IGKV-VV- 02	81°36'32.6916" E	21°11'31.5816"N	279 m	Humus/Paddy Straw	Whitis Brown
IGKV-VV- 03	82°10'56.6436" E	21°38'59.7012"N	366 m	Paddy Straw	White (Centre Brown)
IGKV-VV- 04	82°5'43.8324" E	20°7'42.6072"N	493 m	Humus/Paddy Straw	Light Brown
IGKV-VV- 05	82°5'29.868" E	20°8'3.7968"N	494 m	Paddy Straw	White (Centre Black)
IGKV-VV- 06	81°54'26.5428" E	21°19'14.574"N	293 m	Humus/Paddy Straw	Dark Brown
IGKV-VV- 07	81°53'16.5768" E	19°7'22.926"N	548 m	Paddy Straw	Light Brown
IGKV-VV- 08	81°20'53.8368" E	18°57'35.0568"N	366 m	Paddy Straw	White (Centre Brown)
IGKV-VV- 09	81°3'7.182" E	19°0'1.3896"N	348 m	Paddy Straw	Whitis Brown
IGKV-VV- 10	81°22'16.2012" E	18°59'5.2548"N	369 m	Paddy Straw	Light Brown
IGKV-VV- 11	81°9'50.8788" E	20°45'4.9248"N	321 m	Paddy Straw	Light Brown
IGKV-VV- 12	80°41'55.1256" E	20°55'44.112"N	337 m	Paddy Straw	Brown
IGKV-VV- 13	80°43'35.472" E	20°22'15.312"N	359 m	Paddy Straw	Black
IGKV-VV- 14	80°44'16.3644" E	20°35'14.4996"N	48 m	Paddy Straw	Light Brown
IGKV-VV- 15	81°45'15.0804" E	20°17'6.8604"N	437 m	Paddy Straw	Light Brown
IGKV-VV- 16	81°30'51.156" E	20°17'47.3784"N	389 m	Paddy Straw	White (Center Black)
IGKV-VV- 17	82°1'4.242" E	20°18'26.5752"N	459 m	Paddy Straw	Brown
IGKV-VV- 18	81°48'38.4264" E	20°44'57.5736"N	302 m	Paddy Straw	White (Center Black)
IGKV-VV- 19	83°36'7.7904" E	22°57'.46.1304"N	48 m	Paddy Straw	Black With Peripherl White
IGKV-VV- 20	83°28'54.3072" E	22°48'22.1004"N	614 m	Paddy Straw	Light Brown
IGKV-VV- 21	81°12'34.596" E	19°44'43.17" N	553 m	Paddy Straw	White (Center Black)
IGKV-VV- 22	81° 50' 21.2352" E	19° 59' 54.9528" N	632 m	Paddy Straw	Light Brown
IGKV-VV- 23	82° 37' 22.6344" E	22° 1' 47.8236" N	258 m	Paddy Straw	Light Brown (Centre Brown)
IGKV-VV- 24	81° 18' 19.2276" E	21° 39' 59.1372" N	300 m	Paddy Straw	Brown
IGKV-VV- 25	82° 7' 41.7" E	21° 11' 41.28" N	287 m	Paddy Straw	White (Center Black)
IGKV-VV- 26	81° 58' 20.1864" E	21° 43' 40.5444" N	264 m	Paddy Straw	Brown
IGKV-VV- 27	81° 49' 6.7008" E	21° 46' 39.8028" N	255 m	Paddy Straw	Light Brown
IGKV-VV- 28	82° 3' 0.3276" E	21° 57' 24.2928" N	252 m	Paddy Straw	Light Brown
IGKV-VV- 29	81° 6' 50.4072" E	21° 50' 32.3052" N	361 m	Paddy Straw	White (Center Black)

Udaipur Centre

Total Eight forays were conducted for collection, identification and conservation of wild edible mushrooms during monsoon season of 2016 in the month of July, August and September. Total of 43 different wild mushrooms specimens were collected from Forests of Udaipur, Anadara forest, Pratapgarh forest, Kamblighat forest, Malgarh forest, Desuri Ki Nal forest and Bagidora forest. Some important edible mushrooms collected were *Podaxis pistillaris*, *Agaricus augustus*, *Auricularia auriculae judae*, *Ganoderma lucidum*, *Agaricus sp*, *Agaricus bisporus*, *Phellorinia inquinans*, *Schizophyllum commune*, *Coriolus versicolor* and *Agaricus trisulphuratus*.

From local market of Sirohi, Pali, Jodhpur, Falodi, Bikampura, Khirwa, Pokran, Shergarh,

Balisar, Falna, Khudala, Sadri, Pindwara, Ranakpur, Sayra, Chachju, ungal and Aagoliya area were thoroughly visited and some important wild edible desert mushrooms were being sold fresh as well as dried.

The rates in the local markets during season varied with the area. It was observed that *Phellorinia inquinans* were collected by local peoples and sold in local market in wet form at the rate of Rs. 200/Kg and Rs. 800/kg in the form of dry chips. Further, *Podaxis pistillaris* was used by the local people for vegetable but not sold in the local market. Since *Podaxis* does not have much of the flesh and instead this has fresh basidioma which looks like butter and has highest demand and preference among villagers as well as urban people.





Fig 5.7. Mushroom germplasm collected by Udaipur centre

Table 5.5. List of wild fleshy fungi collected during Monsoon 2016-17 by Udaipur Centre

Acc. number of centre	Name of Mushroom	Date of Collection	Locality	Substrate	GPS Data	DMR Accession no.
UD-01/16	<i>Podaxis pistillaris</i>	30.06.16	Ambamata, Udaipur	On Soil	N-24°34.830' E-073°42.465' Elevation- 660m	DMRO-828
UD-03/16	<i>Agaricus augustus</i>	08.08.16	Ranakpur forest, Malgarh	On Soil	N-24°34.830' E-073°42.465' Elevation-660 m	DMRO-829
UD-07/16	<i>Auricularia Auriculae- judae</i>	10.08.16	Sardarpura, Udaipur	Dead wood of Ber	N-24°34.826' E-073°42.462' Elevation-679 m	DMRO-830
UD-08/16	<i>Ganoderma lucidum</i>	11.08.16	Horticulture farm, RCA, Udaipur	Dead wood of Tikoma	N-24°34.826' E-073°42.462' Elevation-679 m	DMRO-831
UD-12/16	<i>Agaricus spp.</i>	19.08.16	Sita Mata Nursery	On Soil	N-24°34.826' E-073°42.462' Elevation-668 m	DMRO-832
UD-13/16	<i>Agaricus bisporus</i>	19.08.16	Kalka Mata Nursery	On Soil	N-24°34.826' E-073°42.462' Elevation-668 m	DMRO-833
UD-18/16	<i>Phellorinia inquinans</i>	20.08.16	Udainiwas	On Soil	N-24°33.811' E-073°48.278' Elevation-568 m	DMRO-834
UD-20/16	<i>Schizophyllum commune</i>	20.08.16	Chotaguda, Sakroda road	On dead wood	N-24°33.475' E-073°50.019' Elevation-563 m	DMRO-835
UD-21/16	<i>Coriolus versicolor</i>	20.08.16	Chota Guda	On dead wood	N-24°33.475' E-073°50.01' Elevation-563 m	DMRO-836
UD-25/16	<i>Agaricus trisulphuratus</i>	22.08.16	Biodiversity Park	On Soil	N-24°33.743' E-073°50.498' Elevation-739 m	Contaminated
UD-29/16	<i>Clitocybe spp</i>	03.09.16	Kharsan	On dead wood	N-24°40.666' E-073°44.411' Elevation-548 m	DMRO-837
UD-30/16	<i>Polypore spp.</i>	03.09.16	Kharsan	On dead wood	N-24°40.666' E-073°44.411' Elevation-548 m	DMRO-838
UD-31/16	<i>Pleurotus spp.</i>	03.09.16	Basada, Bhinder road	On dead wood of roonj	N-24°33.907' E-074°09.140' Elevation-540 m	DMRO-839
UD-32/16	<i>Polypore spp.</i>	03.09.16	Bhinder	Living tree of Bargad	N-24°33.945' E-074°09.131' Elevation-534 m	DMRO-840
UD-34/16	<i>Coltricia perrenis</i>	03.09.16	Sita Mata Forest	On dead wood of Baheda	N-24°33.945' E-074°09.131' Elevation-534 m	DMRO-841
UD-36/16	<i>Unidentified</i>	03.09.16	Sita Mata forest	On soil	N-24°33.945' E-074°09.131' Elevation-534 m	DMRO-842

CoA, KAU, Vellayani, Kerala

Surveys were conducted in four different districts of Kerala. Due to severe summer the collections were comparatively less. A total of 21 specimens were obtained. These were

isolated and brought into pure culture. Cultures of 13 specimens were sent to DMR in 2 sessions and accession numbers were obtained for 11 cultures.

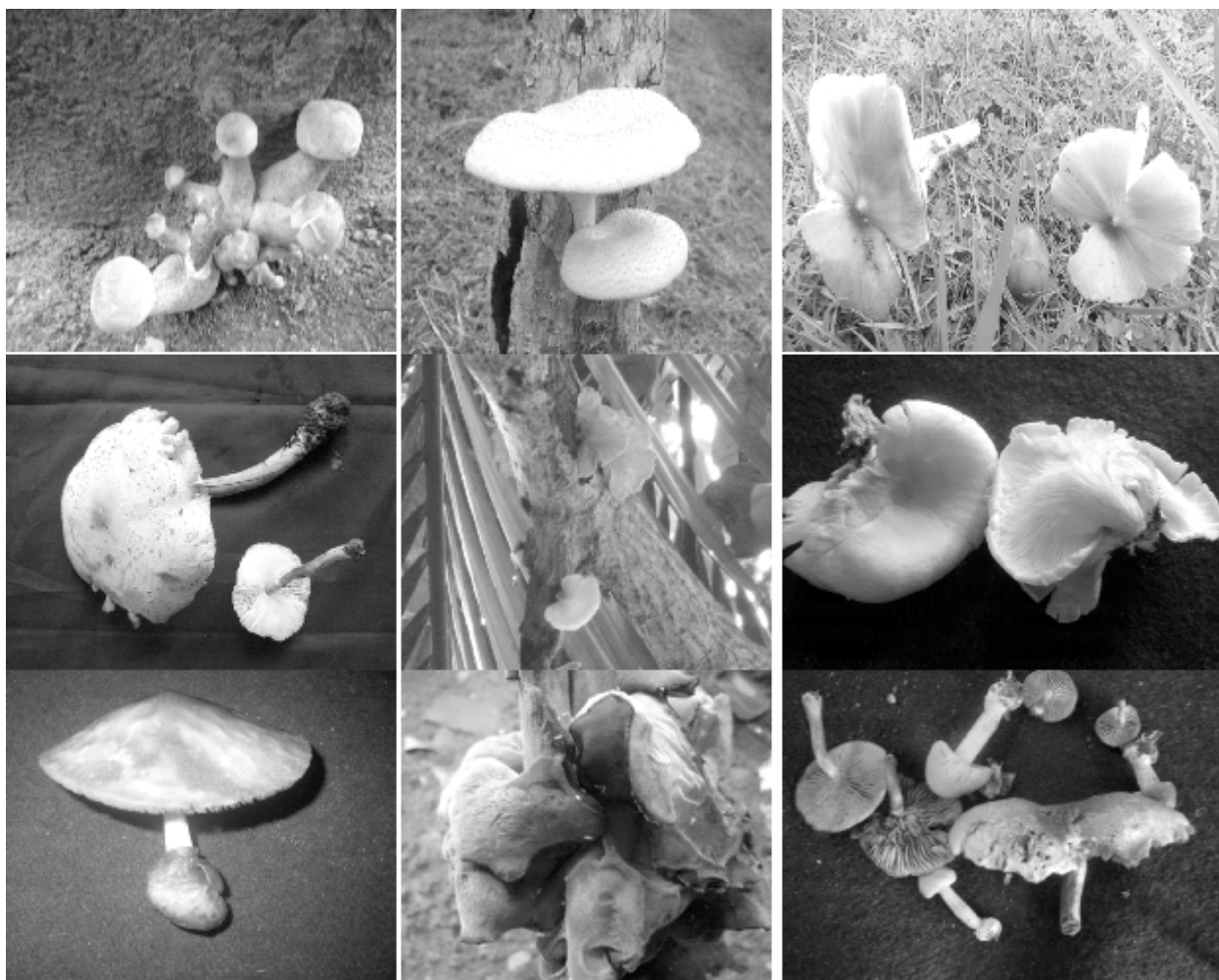


Fig 5.8. Mushroom germplasm collected by Vellayani centre

Table 5.6. List of wild fleshy fungi collected during Monsoon 2016-17 by Vellayani Centre

Name of mushroom	Date of collection	Locality	Substrate	DMR Accession No.	GPS data
<i>Tricholoma</i>	24.05.2016	Ernakulam	Humus	DMRO 843	Latitude 10.07 Longitude 76.54
<i>Lentinus squarrosulus</i>	21.06.2016	Vellayani	Wooden stumps	DMRO 844	Latitude 11.70 Longitude 76.98
<i>Termitomyces</i>	21.06.2016	Vellayani	Humus	DMRO 845	Latitude 11.70 Longitude 76.98
<i>Volvariella</i>	08.07.2016	Anchal	Humus	DMRO 846	Latitude 8.93 Longitude 76.90
<i>Macrolepiota</i>	18.07.2016	Poonkulam	Humus	DMRO 847	Latitude 8.42 Longitude 76.96
<i>Pleurotus</i> sp.	25.07.2016	Kunnukuzhi	Wooden stumps	DMRO 848	Latitude 8.50 Longitude 76.93

<i>Schizophyllum</i>	01.09.2016	Vanchiyoor	Wooden stumps	DMRO 849	Latitude 8.49 Longitude 76.93
<i>Auricularia</i>	21.10.2016	Kunnukuzhi	Wooden stumps	DMRO 894	Latitude 8.50 Longitude 76.93
<i>Laccaria</i>	25.10.2016	Vellayani	Coconut trunk	DMRO 895	Latitude 11.70 Longitude 76.98
<i>Hypsizygus marmorius</i>	10.11.2016	Kunnukuzhi	Wooden stumps	DMRO 896	Latitude 8.50 Longitude 76.93
<i>Pleurotus platypus</i>	14.11.2016	Kottayam	Wooden stumps	DMRO 897	Latitude 9.59 Longitude 76.52

Bhubaneswar Centre

Surveys were conducted in five districts under three agro-climatic situations of the state during Kharif, 2016. Seventeen indigenous mushrooms have been collected and identified based on available information. They were

Clavatia sp, *Canterella* sp *Ganoderma lucidum*, *Gaestrum saccatum*, *Lentinus* sp, *Lepista irina*, *Russula brevipes*, *R. xerampelina*, *R. rosea*, *R. vesca*, *Termitomyces eurrhizus*, *Tricholoma lobyanse*, *Volvariella volvacea*. However, one specimen remain unidentified.

Table 5.7. Wild mushroom germplasm collected at Bhubaneswar centre (2016-17) (Cultures deposited at Directorate of Mushroom Research, Solan)

Scientific Name	Local Name	Habitat/ Substrate	Locality	Date of collection	Edibility
<i>Leucocoprinus</i> sp		Soil	Bhubaneswar, Khurda	6.07.2016	Not known
<i>Termitomyces</i> sp	Nada Chhatu	soil	Bhubaneswar, Khurda	18.07.2016	Edible
<i>Lentinus</i> sp.	Khunti chhatu	Dead wood	Badapokharia, Khordha	18.07.2016	Not known
<i>Ganoderma lucidum</i>	Rheishi Chhatu	Dead wood	Bhubaneswar, Khurda	21.07.2016	Medicinal
<i>Tricholoma lobayensis</i>	-	Soil	Bhubaneswar, Khurda	28.07.2016	Not known
<i>Ganoderma lucidum</i>	Rheishi Chhatu	Dead wood	Bhubaneswar, Khurda	1.08.2016	Medicinal
<i>Ganoderma lucidum</i>	Rheishi Chhatu	Dead wood	KVK, Sundargarh	29.08.2016	Medicinal
<i>Russula brevipes</i>	Patara Chhatu	Soil	KVK, Sundargarh	29.08.2016	Edible
<i>Russula rosea</i>	Nalikukud a Chhatu	Soil	KVK, Sundargarh	29.08.2016	Edible
<i>Russula vesca</i>	-	Soil	KVK, Sundargarh	29.08.2016	Edible
<i>Russula xerampelina</i>	Patara chhatu	Soil	KVK, Sundargarh	29.08.2016	Edible
<i>Lepista irina</i>	-	Soil	KVK, Sundargarh	29.08.2016	Not known
<i>Gaestrum saccatum</i>	-	Soil	KVK, Sundargarh	29.08.2016	Not known
<i>Clavatia</i> sp	-	Soil	Angul	22.09.2016	Not known
<i>Canterella</i> sp	Khunti Chhatu	Dead wood	Itamati, Nayagarh	22.09.2016	Not known
<i>Volvariella volvacea</i>	Palachhatu	Bananapseud ostem	Itamati, Nayagarh	20.09.2016	Edible
Un identified1	-	Dead wood	Itamati, Nayagarh	20.09.2016	Not known

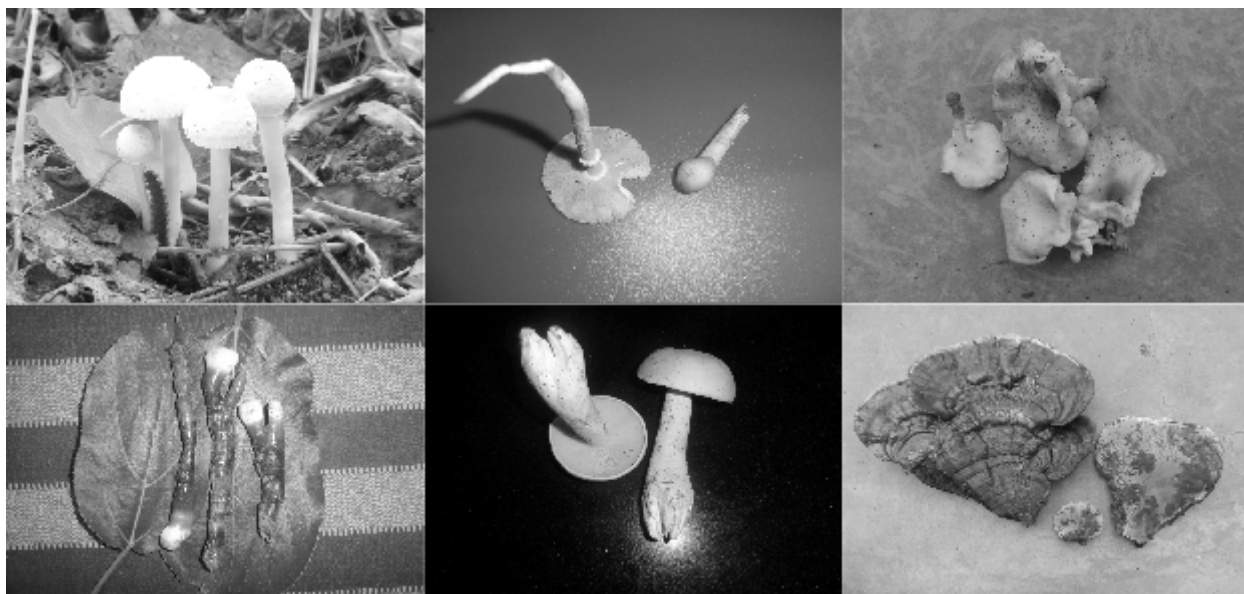


Fig 5.9. Mushroom germplasm collected by Bhubaneswar centre

Pusa Centre

The survey was conducted during the year 2016-17 in Samastipur & Muzaffarpur district

of Bihar. A total of 3 germplasm were collected and identified. They were cultured on PDA and attempt will be made for cultivation.

Table 5.8. Wild mushroom germplasm collected at Pusa centre (2016-17)

Sl.No.	Locality	Germplan	Habitat	RAU No.	Date
1	Samastipur, Pusa	<i>Auricularia</i> sp.	Neem Stem	RAU-07/2016	12.10.2016
2	Samastipur, Pusa	<i>Agaricus</i> sp.	Soil	AB-02/2016	08.07.2016
3	Vaishali, Lalganj	<i>Calocybe</i> sp.	Pipal Tree	CIP-20/2016	09.09.2016

Pasighat Centre

In the month of April 2016 onward start market survey up to August 2016 was conducted during after rains. Local peoples are collecting the mushroom from edible fruit trees of various places and sold in the market the price of the mushroom was increased to 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., Bergulli, Detak,

Depi Molli, Namsing and Pasighat were selected for operation of this work. The entire edible species are attempted to culture in the laboratory. The twelve mushroom species were collected from different parts of Arunachal Pradesh. Throughout collections of species were also overflowing the Proforma given by ICAR-DMR Solan. The species immediately cultured on PDA medium and after some time they spoiled due to weather change frequently in this region and energy problem.

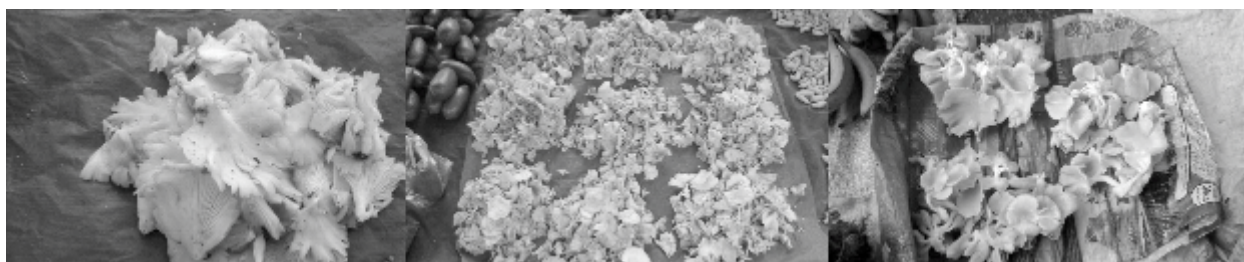


Fig 5.10. Mushroom specimens collected from Pasighat market

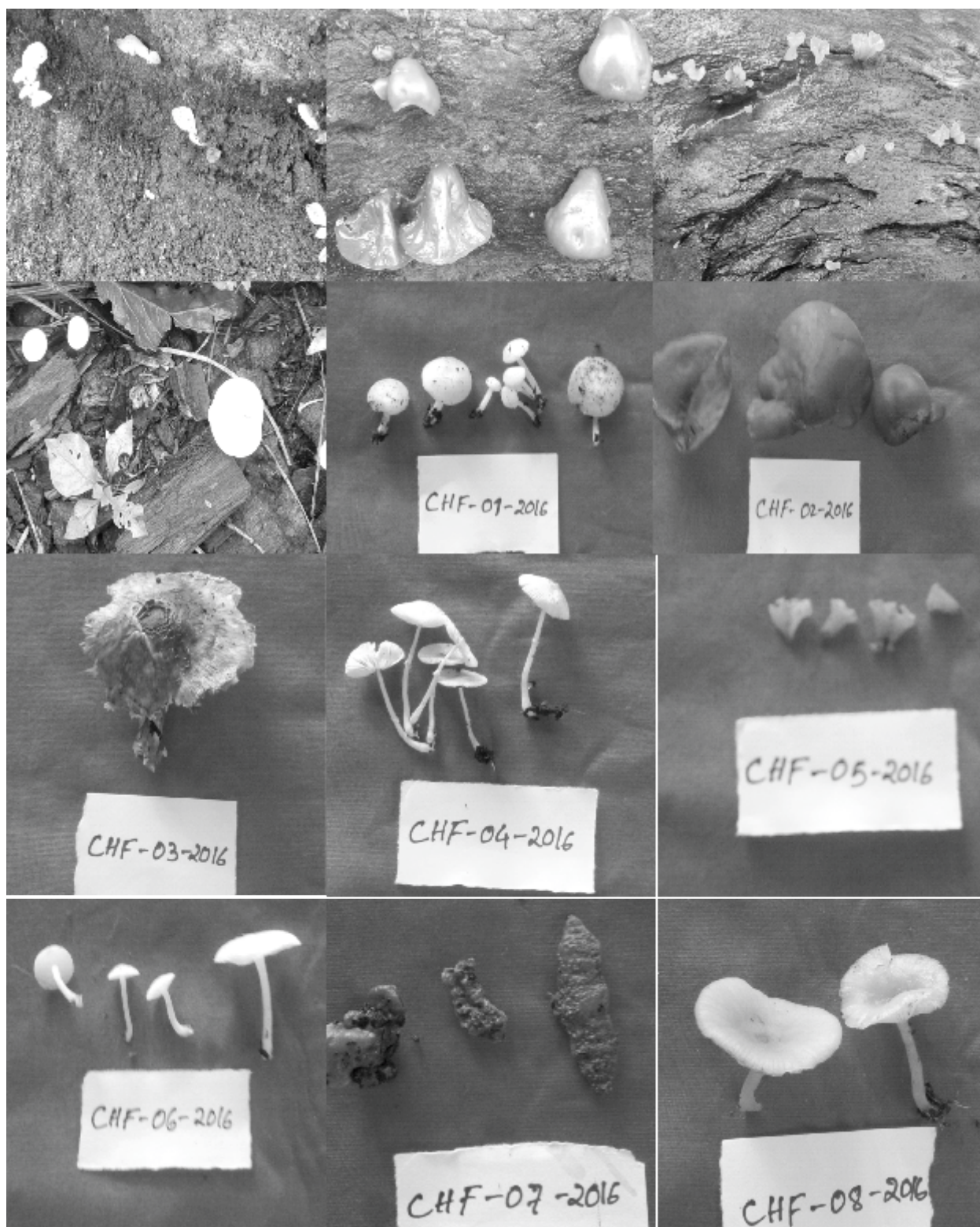


Fig 5.11. Mushroom germplasm collected by Pasighat centre

Sikkim centre

Two mushroom species (Kannaecheo, Chiplaecheo) were collected from Sikkim and two cultures were sent to the ICAR-DMR,

Solan. The cultures were identified and accession numbers were given as, DMRO-892, and DMR0-893.



Kannae Cheo

Chiplae Cheo

Chiplae Cheo

Fig 5.12. Mushroom germplasm collected by Sikkim centre**Nagaland Centre**

Some of the naturally growing seasonal mushrooms were reported during the period at Jharnapani, Dimapur, Nagaland. The collected

mushrooms were depicted with common name, place of collection date of collection and locality of mushroom.



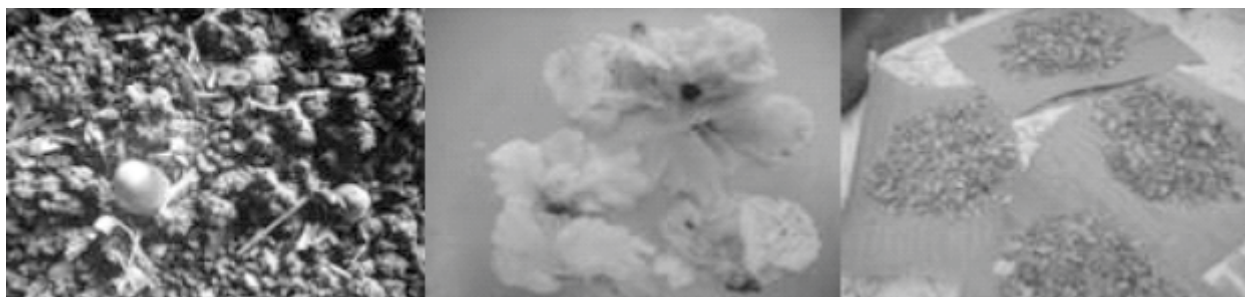


Fig 5.13. Mushroom germplasm collected by Nagaland centre

Manipur Centre

Survey for collection of mushrooms from different districts of Manipur was undertaken during the months of June, August, September

2016 and March 2017. A total of 22 different mushroom specimens were collected, out of which pure culture/dried specimen of 5 mushrooms are to be submitted to ICAR-DMR.



Fig 5.14. Mushroom germplasm collected by Manipur centre

Ranchi Centre

In Jharkhand, wild edible mushrooms are distributed throughout the forest enriched area where plants are dense and soil is acidic. In these areas, wild edible mushrooms are profusely distributed. These wild mushrooms generally observed in the rainy season particularly July-September. The groups of tribal women who are expert in mushroom

hunting, hunting of wild edible mushrooms in the rainy season. The collect wild edible mushrooms sold jointly because collections of the individual are quite small. They were sold their collection in the local market or in urban market on the premium price @ 400-600/Kg. During rainy season they earned nearly 4000-6000/- depending upon collection. In the wild edible mushrooms, Rugra or Puttu (*Geastrum*,

Scleroderma), *Termitomyces* (Khukri) have greater proportion in their collection while other wild edible mushroom viz., Jamun Khukhari (*Boletus*), *Amanita*, Oyster and *Macrolapiota*. *Termitomyces* was sold at a premium price for their delicacy/ tastes among

the all the wild edible mushroom as compared to cultivated mushrooms.

Besides of these two isolates oyster mushroom and evaluated at the Ranchi Centre were isolated from Jharkhand and culture will be deposit at the time of the visit of Solan (Fig.2)

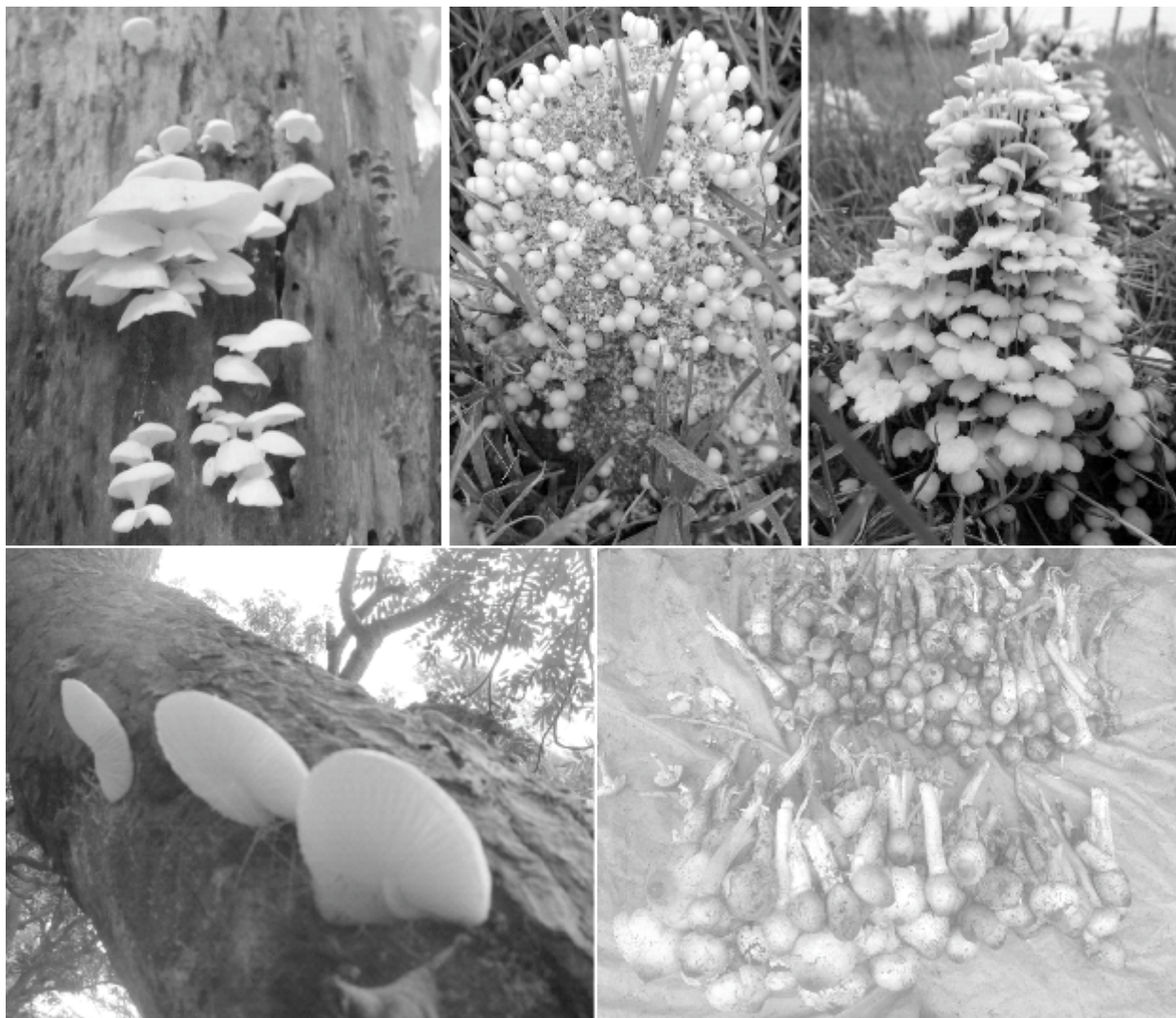


Fig 5.15. Mushroom germplasm collected by Ranchi centre

Nauni Centre

Nauni centre has collected a total of 5 germplasm during 2016-17 and deposited to ICAR-DMR Culture bank. Out of five cultures

deposited, two were find contaminated and three wer given accession numbers of ICAR-DMR culture bank.

Table. 5.9. Germplasm collected and accession numbers allotted to Nauni Centre

Germplasm collected	ICAR-DMR accession no	Germplasm collected	ICAR-DMR accession no
UHF-16-08	DMRO-899	UHF-16-10	Contaminated
UHF-16-18	DMRO-900	<i>Auricularia</i>	DMRO-901
UHF-16-22	Contaminated		

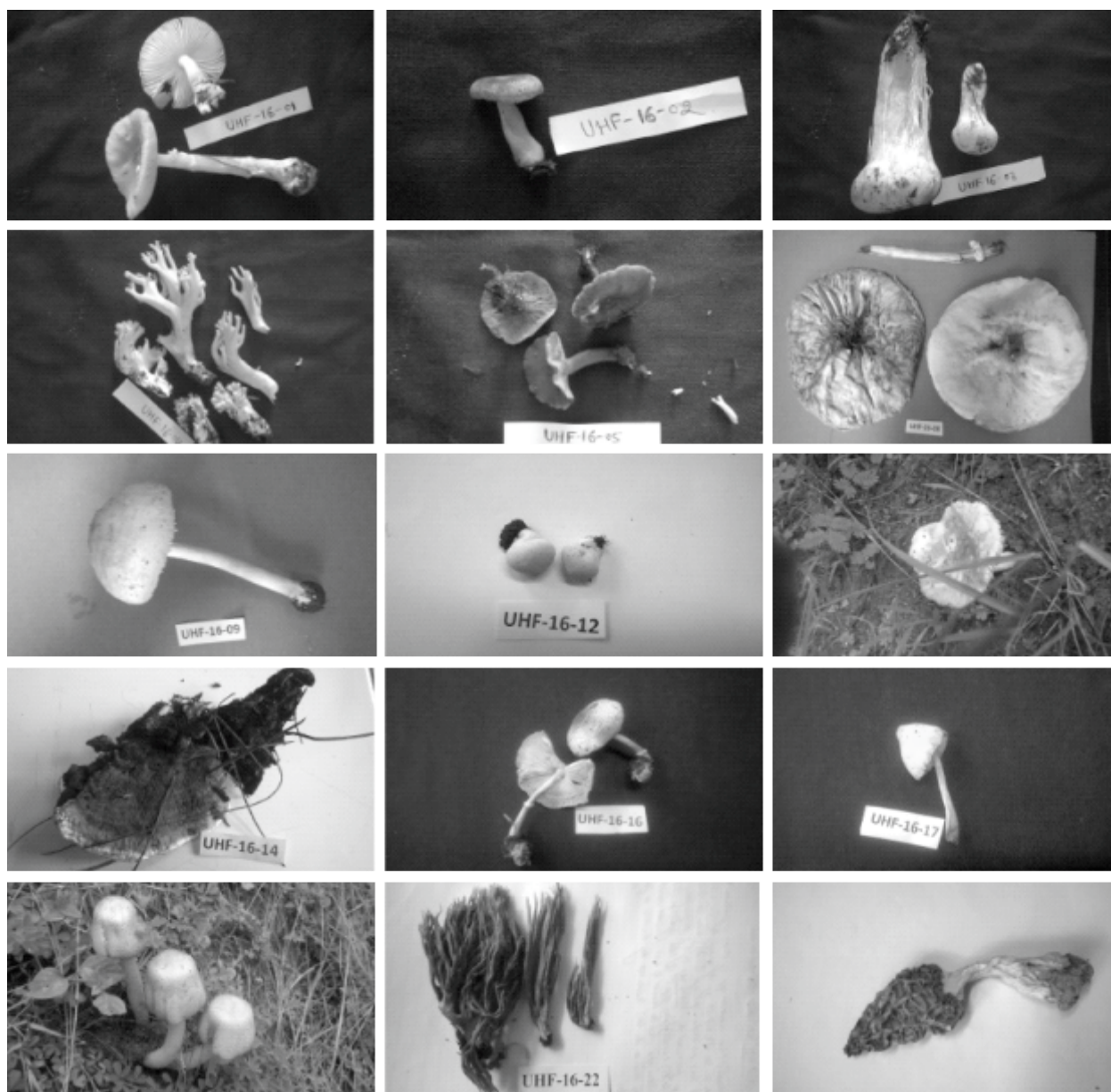


Fig 5.16. Germplasm collected and accession numbers allotted to Nauni Centre

VPKAS Almora Centre

A total of 3 mushroom specimens were collected by Almora centre from Hawalbagh,

Almora, Munsiri area of Pithoragarh district and Nanital locality. The photographs of the specimens are given in the fig 5.17.



Fig 5.17. Germplasm collected and accession numbers allotted to Almora Centre

SKAUST, Jammu Centre

Surveys were conducted in Doda, Rajouri and Ramnagar area of Udhampur district during the month of July-September, 2016 to collect wild edible mushrooms of the region. Spot photographs of the samples in wild were taken and the samples were brought to the laboratory. Fresh samples of mushrooms were cultured

and fruit bodies have also been preserved in the mushroom museum of the centre. Dried samples as well as cultures of wild mushroom were submitted to DMR, Solan. Five accession numbers viz. DMRO-920, DMRO-921, DMRO-922, DMRO-923 and DMRO-924 were obtained for the cultures J-5/16-17, J-6/16-17, J-9/16-17, J-11/16-17 and J-28/16-17 respectively.



Fig 5.18. Wild Mushroom Flora collected by Jammu Centre

SKAUST, Kashmir Centre

Survey was conducted this year in Dachigam area of Srinagar and Baramulla District for

collection and identification of wild edible mushrooms.



Fig 5.19. Wild Mushroom Flora collected by Kashmir Centre

AAU, Jorhat Centre

A total of three mushroom germplasm collected by Jorhat centre and deposited at ICAR-DMR Culture bank. The accession number allotted to the submissions are DMRO-902, DMRO-903 and DMRO-904.

Kalyani Centre

Surveys were conducted during the month of August, September 2016 in districts of Nadia (22° 42' 21.2796" N 88° 45' 10.8288" E), 24 Parganas North (22° 37' 0.516" N 88° 24' 10.422" E), Hoogly (22° 53' 9.1572" N 88° 23' 30.8508" E) and Darjeeling (27° 2' 9.6252" N 88° 15' 45.63" E) and Klempong (27° 3' 33.6816" N 88° 28' 10.0308" E) Siliguri (26° 43' 37.5636" N 88° 23' 43.0296" E) samples of wild edible mushroom

consumed by local population were collected. A total number of 6 specimens of gilled fungi and polypores have been collected and tentatively identified as *Pleurotus ostreatus*, *Pleurotus* sp., *Ganoderma lucidum*, *Termitomyces microcarpus*, *Calocybe indica*. and others could not be identified aptly. Characters for mushroom identification have been noted and efforts are being made to identify the mushroom samples. Cultures along with data shall be provided to the nodal centre after properly identifying the samples. 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.



Fig 5.20. Wild Mushroom flora collected by Kalyani centre

Tripura centre

Three mushroom cultures among which one was identified as *Pleurotus sajor caju* and the

remaining yet to be identified were collected from Tripura, isolated and deposited at ICAR-DMR, Solan culture bank.

Table. 5.10. Germaplasm collected and accession numbers obtained by Tripura centre

Sl. No	Accession number	Submitted cultures	Mushroom identified
1.	DMRO-917	<i>Pleurotus sp</i>	<i>Pleurotus sajor-caju</i>
2.	DMRO-918	K2	yet to be identified
3.	DMRO-919	K3	yet to be identified

6. EXTENSION ATIVITIES

Bhubaneswar Centre

Table 6.1. Status of Mushroom in Odisha

Sl. No	Particulars	Information/ Production (tonnes/ annum)	Per cent of total production
1	Paddy straw mushroom	9,550	60
2	Oyster mushroom	6,310	39
3	Button mushroom	126	1
4	Total mushroom production	15,986	100
5	No. of paddy straw mushroom growers (producing over 50kg/day)	500	-
6	No. of oyster mushroom growers (producing over 50kg/day)	800	-
7	No. of spawn production units	255	-
8	Total spawn production	4,047	-
9	No. of processing units	4	-

*Updated till 31.03.2017

Table 6.2. On-campus Training: AICRP on Mushroom, Bhubaneswar

Sl.No.	Date	Venue	farmers participated	Particulars	No. of lady participants
1.	24.05.2016-28.05.2016	OUAT	34	Mushroom cultivation and processing	04
2.	21.06.2016-25.06.2016	OUAT	34	Mushroom cultivation and processing	09
3.	26.07.2016-30.7.2016	OUAT	45	Mushroom cultivation and processing	08
4.	22.08.2016-31.08.2016	OUAT	29	Mushroom spawn production	05
5.	20.09.2016-24.09.2016	OUAT	43	Mushroom cultivation and processing	06
6.	31.10.2016-4.11.2016	OUAT	25	Mushroom cultivation and processing	25
7.	27.12.2016-31.12.2016	OUAT	25	Mushroom cultivation and processing	02
8.	15.03.2017-24.03.2017	OUAT	22	Mushroom spawn production	04
	Total		257		63 (24%)

Table 6.3. On-campus Training: CTMRT, Bhubaneswar

Sl.No.	Date	Venue	farmers participated	Particulars	No. of lady participants
1.	20.07.2016-30.7.2016	OUAT	23	Mushroom spawn production	05
2.	24.10.2016-28.10.2016	OUAT	28	Mushroom cultivation and processing	06
3.	22.11.2016-26.11.2016	OUAT	49	Mushroom cultivation and processing	07
4.	19.01.2017-28.01.2017	OUAT	19	Mushroom spawn production	04
5.	14.02.2017-18.02.2017	OUAT	35	Mushroom cultivation and processing	08
6.	21.03.2017-25.03.2017	OUAT	47	Mushroom cultivation and processing	16
	Total		201		46 (22%)

Table 6.4. Lecture-cum-demonstrations

Sl.No.	Date	Venue	Participants (No.)	Male	Female	Composition of participants
1	04.04.2016	IMAGE, Bhubaneswar	30	20	10	Different districts of Odisha
2	05.04.2016	IMAGE, Bhubaneswar	30	20	10	Different districts of Odisha
3	06.04.2016	IMAGE, Bhubaneswar	30	20	10	Different districts of Odisha
4	08.04.2016	IMAGE, Bhubaneswar	30	20	10	Different districts of Odisha
5	28.05.2016	CoA, OUAT, Bhubaneswar	120	100	20	Teachers and PG students of OUAT
6	30.06.2016	OUAT, Bhubaneswar	250	150	100	Teachers and students of OUAT
7	17.07.2016	CARD, Badapokharia	21	5	16	Farmers of Khordha block
8	04.09.2016	Benupur, Khordha	10	-	10	Lady farmers of Benupur
9	05.09.2016	Conference Hall, CIFA, Bhubaneswar	200	150	50	Senior Scientists of KVKs and Progressive farmers
10	13.09.2016	Dept. of Agri Business Management, Utkal University, Bhubaneswar	160	80	80	Students of Agri Business Management
11	17.09.2016	Girigangaput, Bhubaneswar	30	30	-	Farmers of Girigangaput, Khordha
12	02.10.2016	Chadheibar, Khordha	10	10	-	Farmers of Chadheibar, Khordha
13	23.10.2016	Patia, Nayagarh	50	-	50	Lady farmers of Patia, Nayagarh
14	27.10.2016	Coconut Development Board, Bhubaneswar	25	25	-	Farmers from Kendrapara district of Odisha
15	11.11.2016	Jamujhari, Khordha	30	30	-	Farmers of Jamujhari, Khordha
16	26.12.2016	Soro, Balasore	100	-	100	Lady farmers of the locality
17	11.01.2017	OUAT, Bhubaneswar	120	100	20	Teachers and students of OUAT
18	16.01.2017	Dandamakundapur, Puri	50	45	5	Farmers of the locality
19	18.01.2017	Rasmirekha Mushroom, Pipli, Puri	15	-	15	Final year students of B.Sc(Ag)
20	26.01.2017	IFFCO, Cuttack	30	30	-	Farmers from Jajpur, Bhadrak, Kendrapara, Jagatsinghpur
21	27.02.2017	KVK, Nuapara	100	60	40	Farmers of Nuapara district
22	4.03.2017	Directorate of Extension Education, OUAT	25	20	5	Farmers of Jagtsinghpur district
23	05.03.2017	IFFCO, Cuttack	50	-	50	Farm women of Jagatsinghpur
24	28.03.2017	Balakati, Khordha	50	30	20	Farmers of the locality
Total			1566	945	621 (40%)	

Table 6.5. Mass communication

Sl.No.	Item	Number
1	Participation in Krishi-exhibition	2
2	TV programme	5
3	Radio programme	3
4	Popular articles	1
5	Publication of leaflets/ booklets	-
6	Farmers-scientist interaction	3
7	Field day	2

Exposure visit of farmers

A total number of 1099 visitors comprising of farmers, Govt. functionaries and students visited the centre during 2016-17 and were apprised of the activities of the centre.

Table 6.6. Exposure visit of farmers

Sl. No.	Country/States	No. of visitors	Share (%)
1	Odisha	687	63
2	West Bengal	249	23
3	Maharashtra	88	8
4	Chhatisgarh	35	3
5	Himachal Pradesh	25	2
6	Phillippines	15	1
Total		1099	100

Table 6.7. Composition of visitors

Sl. No.	Composition	No. of visitors	Share (%)
1.	Farmers	779	71%
2.	Govt. officers	82	7%
3.	Students	238	22%
Total		1099	100

*27% (297) of the total visitors were ladies

Monitoring of spawn production units

Eight spawn production centers have been monitored during the period under report on

quality of the planting materials produced and necessary addressal of problems if any (Table 6.8).

Table 6.8. Monitoring of spawn production units

Sl. No.	Date of visit	Spawn production units
1	29.08.2016	KVK, Jharsuguda
2	30.08.2016	KVK, Sundargarh
3	26.12.2016	Soro, Balasore
4	18.01.2017	Rasmirekha Mushroom, Pipli, Puri
5	25.01.2017	Indipur, Dhenkanal
6	27.02.2017	KVK, Nuapara
7	16.03.2017	Rasmirekha Mushroom, Pipli, Puri
8	17.03.2017	Tamando, Khordha

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 were extended to Socio Economic Development Association (SEDA), Cuttack for promotion of mushroom cultivation in Mahanga block of Cuttack district.
- Working as an expert (Plant Pathology) for OCTMP, Dept. of Water resources, Govt. of Odisha.
- Working as collaborative scientist for the pilot project on rice check for Odisha

under IRRI-OUAT collaborative project.

- Working as member of advisory committee of Centre of Excellence, Directorate of Horticulture, Bhubaneswar.
- Advisory services were extended to large number of farmers through telephone calls / personal contacts/ e-messages throughout the year on different aspects of mushroom cultivation.

Involvement of NGOs

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

Visit of dignitaries**Table 6.9.** Visit of dignitaries to Bhubaneswar centre

Date	Visitors
21.10.2016	: Hon'ble Vice Chancellor, OUAT, Bhubaneswar along with ICAR- Accreditation Team, Dean, College of Agriculture, DPME and Academic Advisor, OUAT
23.12.2016	: Hon'ble Vice Chancellor, OUAT, Bhubaneswar along Dean, College of Agriculture and former Dean, PG Studies.
27.02.2017	: Dr. R.C. Upadhyaya, Former Director, ICAR-DMR, Solan (HP)
16.03.2017	: Dr. V.P.Sharma, Director, ICAR-DMR, Solan (HP)
26.03.2017	: S.J. Naveen Patnaik, Hon'ble Chief Minister, Govt. Of Odisha

Quality spawn supply

A quantity of 5037 packets of spawn (1007.4kg) of Paddy straw and Oyster mushroom were distributed to the farmers @ ₹ 12/-/packet* from CTMRT and AICRP on Mushroom, OUAT, Bhubaneswar with a resource generation of ₹ 60,444/-.

*The rate of spawn was hiked from ₹ 42.50/- to ₹ 60/- per kg w.e.f. 20.10.2016.

Sale proceed

An amount of ₹ 1,50,00/- has been deposited in the University towards the sale proceed of CTMRT and AICRP on Mushroom, OUAT, Bhubaneswar.

Experiential Learning Programme

Twenty numbers of final year B.Sc (Ag)

students were trained in mushroom cultivation, processing and spawn production from 16.02.2017 to 16.05.2017.

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.

Farmers' achievement

- Sri Ajaya Kumar Prusty, Dhenkanal was felicitated in the Mushroom Mela organized by ICAR-DMR on 10.09.2016
- Sri Sanjit Kumar Mohanty, Pipli, Puri was felicitated Krishak Samrat Samman Award by Mahindra and Mahindra Agri-Division.

Training, Demonstration and Mass Communication

During 2016-17, 14 trainings including 8 of AICRP on Mushroom with a total of 458 trainees have been conducted on mushroom cultivation and processing and mushroom spawn production at OUAT, Bhubaneswar (Table 6.2 and 6.3). Lecture-cum-demonstration programme were attended at 20 locations involving 1566 trainees on mushroom

cultivation, out of which 621 (40%) were ladies belonging to different self help groups (Table 6.4). The centre participated in 2 Krishi exhibitions. Besides, five TV programmes, three radio programmes and two field days were under taken during the period on mushroom cultivation and processing and spawn production. The scientist also participated in three farmer-scientist interaction programme (Table 6.5).



Farmers training on mushroom cultivation and lecture-cum-demonstration



Visit of dignitaries to the centre



Visit of dignitaries to the centre

Activities of B.Sc (Ag) students



Fig. 6.1. Extension activities organized by Bhubaneswar centre

Pune Centre

Extension Activities

Different extension activities were undertaken by the scientists and staff working at AICRP on

Mushroom, Pune Centre in order to promote and popularize the mushroom cultivation technology in Maharashtra state during 2016-17. These activities are as follows.

Table 6.10. Extension activities of AICRPM, Pune Centre (01.04.2016 to 15.03.2017)

Sr. No.	Activities	Number
1.	Participation in Agril. Exhibition/s	02
2.	Oyster and Milky Mushroom Cultivation training/s	13
3.	Spawn production training/s	02
4.	Mass Demonstration/s	03
5.	Queries by e-mail	561
6.	Visitors to mushroom project (Including school/college students, farmers/mushroom growers/ research workers, teachers etc.)	1997
7.	Spawn production and sale	2.79 MT
8.	Total revenue receipts generated through University funded Revolving Fund.	Rs. 4,51,285/-

Mushroom cultivation trainings

To transfer the technology of mushroom cultivation, fourteen (14) training programmes on oyster and milky mushroom cultivation

technology and two trainings on Spawn production technology were conducted by the scientists of this project. Total 747 trainees were participated in these trainings.

Table 6.11. Mushroom cultivation trainings at Pune centre

Sr. No.	Name of training	Date	No. of Participants
1	Oyster & Milky Mushroom Cultivation Training Programme	02.04.2016	22
2	Oyster & Milky Mushroom Cultivation Training Programme	07.05.2016	36
3	Oyster & Milky Mushroom Cultivation Training Programme	04.06.2016	36

4	Oyster & Milky Mushroom Cultivation Training Programme	02.07.2016	31
5	Oyster & Milky Mushroom Cultivation Training Programme	06.08.2016	28
6	Mushroom Spawn Production Training Programme	31.08.2016 to 02.09.2016	03
7	Oyster & Milky Mushroom Cultivation Training Programme	03.09.2016	44
8	Oyster & Milky Mushroom Cultivation Training Programme	01.10.2016	55
9	Oyster & Milky Mushroom Cultivation Training Programme	15.10.2016	19
10	Oyster & Milky Mushroom Cultivation Training Programme	05.11.2016	23
11	Oyster & Milky Mushroom Cultivation Training Programme	03.12.2016	47
12	Mushroom Spawn Production Training Programme	15.12.2016 to 17.12.2016	08
13	Commercial button Mushroom Cultivation Training Programme at Waghere College, Saswad, Dist : Pune	02.01.2017	185
14	Oyster & Milky Mushroom Cultivation Training Programme	07.01.2017	68
15	Oyster and Milky Mushroom Cultivation training Programme	04.02.2017	49
16	Oyster and Milky Mushroom Cultivation training Programme & Mushroom Day Celebration	04.03.2017	93
Total			747

Mass communication

The technology of mushroom cultivation was also transferred by sending pamphlets by post as well as by participating in exhibitions and attending farmers rallies organized by different agencies at different places.

- 1) Agril Exhibition organized by AGROWON at College of Agriculture, Pune.
- 2) KISSAN-2016 international Agril. Exhibition at Moshi, Dist- Pune.

Mass Demonstration

Two mass demonstrations cum trainings on mushroom cultivation and processing were organized by this project to popularize oyster mushroom among rural women.

- 1) Village – Saswad, Tal- Saswad, Dist: Pune, on 02.01.2017.
- 2) Village – Khed, Tal- Indapur, Dist: Pune, on 19.12.2016.



Visit of students from Marathwada



Visit of college students



Oyster Mushroom training



Oyster Mushroom training



Mushroom day celebration



Visit of Director, ICAR, DMR to Weikfield Mushrooms



Visit of Director, ICAR-DMR to
Balaji Mushrooms



Visit of Vice Chancellor,
MPKV Rahuri



Visit of Dean, MPKV Rahuri

Fig 6.2. Extension activities and visits to AICRP, College of Agriculture, Pune

Raipur Centre

Trainings

- 12 One day trainings (Last Saturday of every month)
- 2 TSP trainings (4 days training Kopra village Gariyaband, and Barari Dhamtari)
- 1 TSP Training of 2 days at Raipur
- One Model training Course on Mushroom production and processing Technology of Seven days sponsored by Ministry of Agriculture
- Mushroom day organised on 23.12.1016
- Participation in Seven days Rajyotsav 2016-2017(Mushroom stall with display and simultaneous Live demonstration for entire week)
- Participation in Five days Rashtriya Kisaan Mela 2016-2017(Mushroom stall with display and simultaneous Live demonstration for entire week)
- Participation in Three days flower show 2016-2017
- One day training on spawn production Technology at Raipur and Five days at Rajnandgown district
- One day training in NSS Special camp at Dharmapura and Tulsi village
- Five days training on Mushroom cultivation in NSS state level camp to more than 1500 NSS Volunteers
- More than 1000 Jan pratinidhi from all over Chhattisgarh trained in mushroom cultivation technology under Hamar Chhattisgarh Yojna
- Training at KVKs on Mushroom Production Technology across Chhatisgarh
- Training and on farm trial of Button mushroom cultivation at Raipur, Ambikapur, Korea, Bilaspur, Amadoh and Jagdalpur

Table. 6.12. Number and type of training conducted at Raipur centre

क्र.	विवरण	अवधि	प्रशिक्षण संख्या
1	मुख्यमंत्री कौशल विकास योजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण	90 घण्टा/प्रति प्रशिक्षण	8
2	मनरेगा लाइफ परियोजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण	6 दिवस प्रति प्रशिक्षण	6
3	प्रधानमंत्री कौशल विकास योजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण	200 घण्टा/प्रति प्रशिक्षण	2
	योग	—	16



मनरेगा लाइफ परियोजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण



प्रधानमंत्री कौशल विकास योजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण



मुख्यमंत्री कौशल विकास योजना अंतर्गत मशरूम उत्पादन विषय पर प्रशिक्षण



जिला जेल कांकर में बंदियों को मशरूम उत्पादन विषय पर प्रशिक्षण



Training to NSS Volunteers during State level Camp



Training at KVK Sarguja



Training at KVK Sarguja



Mushroom Day celebration



Seasonal Button mushroom cultivation at Korea District



Visit of Dean, College of Agriculture Rajnandgown and Jagdalpur



Model Training course



Visit of Dr. RC Upadhyay, Former Director, ICAR-DMR, Solan



State Minister of Agriculture Shri. Brijmohan Agrawal Mushroom Stall

Fig. 6.3. Extension activities and visits at Raipur centre

Revenue generation

Sale of Pure culture, Mother spawn, sister spawn, spawned bags, fresh mushroom, mushroom processed products and literature.

Total Planting spawn sold	40 Quintals
Mother spawn sold	200 Bottles
Pure culture tube sold	38 Tubes
Fresh Mushroom	450Kg

Nauni Centre

1. Lectures delivered in specialized training programmes, including farmers camps, short duration training courses -20

2. No. of farmers benefitted- more than 600

3. National Mushroom day was celebrated by Dr.YS Parmar univ. of Hort. & Forestry, Nauni at Krishi Vigyan Kendra, Kandaghat on 23rd Dec. 2016 in which around 50 farmers mainly female participated. Various mushroom experts namely Dr CL Jandaik, Dr BC Suman, Dr CD Thapa, Dr Dharmesh gupta, Dr DD Sharma (Incharge, KVK), Dr Arti Shukla deliberated on various topics related to cultivation of different mushrooms. It was a great success.



Fig. 6.4. Extension activities at Nauni Centre

Murthal

Table 6.13. Detail of Trainees for the year 2016-17

S. No.	From	To	Participants	Batch No.
1	21/6/16	24/6/16	23	186
2	20/7/16	23/7/16	42	187
3	26/7/16	29/7/16	36	188
4	08/08/16	11/08/16	53	189

5	29/8/16	01/09/16	59	190
6	21/9/16	24/9/16	39	191
7	24/10/16	27/10/16	32	192
8	23/11/16	26/11/16	30	193
9	05/12/16	08/12/16	37	194
10	11/12/16	13/12/16	20	195
11	20/12/16	23/12/16	74	196
12	04/01/17	07/01/17	61	197
13	11/1/2017	14/1/17	46	198
14	18/1/17	21/1/17	38	199
15	07/2/17	10/02/17	75	200
16	22/2/17	25/2/17	54	201
17	08/03/17	11/03/17	38	202
		Total	757	



Women trainees



Participation in Mushroom Mela at Solan



Participation in Kisan Mela at Panipat

Participation in Swaran Jayanti
Mega Expo at KarnalParticipation in Agro Tech at
Chandigarh

Mushroom Day Celebration



Hon'ble Agriculture Minister, Haryana



Hon'ble Chairman, Haryana Kisan Ayog



Director, NBAGR Karnal



Dr. V.P. Sharma, Director, DMR Solan

Dr. K.P. Singh, Vice Chancellor,
HAU Hisar

Delegates from The Netherlands

Distribution of Mushroom Spawn
by DMR

Visitors from Kerala



Practical Training

Fig. 6.5. Extension activities of HAIC, Murthal

Table. 6.14. Production & Sale of Spawn & Compost 2016-17

S. No.	Month	Spawn (kg)	Compost (kg)
1	April 2016	2968	36863
2	May 2016	3063	2684
3	June 2016	2129	8108
4	July 2016	951	10475
5	August 2016	1119	24585
6	Sept. 2016	2391	37390
7	Oct. 2016	29288	109250
8	Nov. 2016	21438	62054
9	Dec. 2016	10624	118312
10	Jan. 2017	7483	49868
11	Feb. 2017	8033	9567
Total		89487	469156

Pusa Centre

- Spawn Sold : 3860 kg. Spawn was supplied to growers.

- Mother Spawn Supplied : 5360 bottle (each 300 g.) mother spawn was supplied.

Table 6.15. Spawn supplied by Farmers

S.No.	Name	Qty. (kg.)
1	Anita Mushroom Spawn Lab, Nalanda (Anita Kumari)	2,500
2	Buddha Spawn Lab, Nalanda (Mudhu Patel)	5,000
3	Mohan Keshary Lab, Jamuiai (Mohan Keshary)	2,500

4	Rani Mushroom Spawn Lab, Vaishali (Manorma Singh)	3,000
5	Mahila Mushroom Kisan Lab, Darbhanga (Puspa Jha)	1,500
6	Geeta Spawn Lab, Thama, Samastipur (Ravindra Kr. Rabi)	1,000
7	KVK, Muzaffarpur	1,200
8	KVK, East Champaran	800
9	Dema, Nawada (Manoj Kr. Singh)	6,000
	TOTAL (kg.)	23,500

Table 6.16. Spawn and mother spawn supplied to farmers

S. No.	Mother spawn supplied	Spawn Supplied		Total spawn supplied
		Pusa Centre	Farmers/KVKs	
1	5360 bottles (each 300 g)	4010 kg.	23500 kg.	27510 kg.

Table 6.17. Spawn and mother spawn supplied to farmers during 2015-16 and 2016-17

S. No.	Mother spawn supplied		Spawn supplied	
	2015-16	2016-17	2015-16	2016-17
1	1,742 bottle (each 300 g)	5,360 bottle (each 300 g)	10,110 kg.	27,510 kg.

*Training Conducted***Table 6.18.** Off campus / on campus one day Mushroom cultivation training Programme

S. No.	Date	Venue	No. of Participants		Total	Remarks
			Male	Female		
1	29.05.2016	Panchwania (Madhubani)	13	61	74	TSP (Dudhia Mushroom Cultivation)
2	18.06.2016	Baligargh (Sitamadhi)	41	186	227	TSP (Dudhia Mushroom Cultivation)
3	24.07.2016	Mandal Kara (Samastipur)	103	20	123	AICRP (Oyster Mushroom Cultivation)
4	30.07.2016	RAU, Pusa (Farmers of Chhatrapur, Supaul)	08	12	20	TSP (Oyster Mushroom Cultivation)
5	31.07.2016	Mandal Kara (Samastipur)	--	26	26	AICRP (Oyster Mushroom Cultivation)
6	20.08.2016	Gidarmari Basantpur (Supaul)	16	10	26	AICRP (Oyster Mushroom Cultivation)
7	19.10.2013	Runni Saidpur ghat (Sitamadhi)	10	27	37	TSP (Button Mushroom Cultivation)
8	23.10.2016	Mandal Kara (Samastipur)	123	31	154	AICRP (Button Mushroom Cultivation)
9	25.10.2016	CRPF camp (Muzaffarpur)	30	18	48	AICRP (Button Mushroom Cultivation)
10	26.10.2016	Panchhmania (Madhubani)	12	40	52	TSP (Button Mushroom Cultivation)
11	11.12.2016	Mandal Kara (Samastipur)	78	--	78	Products developments of Button Mushroom
12	24.12.2016	Guriyar College, Jhaja (Jamui)	--	50	50	TSP
13	15.01.2017	Dumra	29	61	90	AICRP (Button Mushroom Cultivation)
14	22.01.2017	Padary Aurai	43	130	173	TSP (Oyster Mushroom Cultivation)
15	31.01.2017	Sitalkund (East Champaran)	30	42	72	NRC, Litchi
Total			536	714	1250	

A total of 15 One day off campus / on campus training cum awareness programme were organized in different district of Bihar presented in Table 6.18. It is apparent from the table that a total of 1250 farmers including 714 women were trained in oyster, button and

dudhiya mushroom production and button mushroom composed production technology (low cost and short time- 15 days). They learnt production protection management, marketing, value addition of different mushrooms.

Table 6.19. One week / three days Mushroom cultivation training Programme

S. No.	Date	Venue	No. of Participants		Total	Remarks
			Male	Female		
1	15.07.2016 to 21.07.2016	RAU, Pusa	10	10	20	AICRP Students
2	29.08.2016 to 31.08.2016	RAU, Pusa	13	28	41	TSP, DMR Solon, Runni Saidpur
3	23.09.2016 to 29.09.2016	RAU, Pusa	17	05	22	AICRP
4	03.11.2016 to 05.11.2016	RAU, Pusa	44	03	47	AICRP, Button Mushroom
5	03.12.2016 to 05.12.2016	RAU, Pusa	51	154	205	TSP, Button Mushroom
6	24.01.2017 to 30.01.2017	RPCAU, Pusa	06	34	40	TSP
7	13.02.2017 to 19.02.2017	RPCAU, Pusa	19	32	51	AICRP, Students
8	23.03.2017 to 29.03.2017	RPCAU, Pusa	20	40	60	AICRP
9	23.03.2017 to 29.03.2017	RPCAU, Pusa	08	54	62	TSP
10	29.03.2017 to 04.04.2017	RPCAU, Pusa	05	60	65	TSP
Total			193	420	613	

One week / three days on campus 10 training programme were organized at Pusa Campus, presented in Table 6.19. All together 613

farmers including 420 women were trained in mushroom cultivation technology.

Table 6.20. Mushroom Field day / Seminar

S.No.	Date	Venue	No. of Participants		Total	Remarks
			Male	Female		
1	04.01.2017	Runni Saidpur Ghat	350	500	800	TSP
2	06.03.2017	Khanwa (Nawada)	200	1600	1800	AICRP Khanwa (Nawada)
3	19.03.2017	Panchwania (Madhubani)	120	800	920	TSP
Total			670	2900	3520	

One day off campus 03 Field day / Seminar cum training and awareness programme were organized in different district of Bihar presented in Table 6.20. It is apparent from the

'table 6.20' that a total of 3520 farmers including 2900 women were trained participated in programme.

Table 6.21. Kishan Ghosthi organized

Date	Place	No. of Participants		Total	Remarks
		Male	Female		
18.09.2016	Baligargh	82	74	156	TSP

National mushroom day celebration

National Mushroom Day on “Mushrooms for Nutrition and Health” was organized on 23rd December, 2016. A total of 180 farmers including 118 women, 70 Dr.RPCA Staff and 32 scientists were participated. Different

mushroom products i.e. sweets, dry mushroom, pickles, powder fresh mushroom was placed in their stalls by farmers from Siwan, Muzaffarpur, Samastipur, Vaishali, East Champaran, Darbhanga, Sitamadhi and Begausarai.

Table 6.22. Participants in mushroom day celebration

Date	Place	No. of Participants		Total	Remarks
		Male	Female		
23.12.2016	Mushroom Centre, Pusa	62	118	180	Farmers & entrepreneurs
		68	02	70	Staff members
		24	08	32	Scientist
TOTAL		154	128	282	

Table 6.23. Inputs supplied to Tribals

Village	No. of family	Inputs supplied						Remarks
		Straw	Spawn	Button compost	Poly bags	Improved rice seed	Yield of rice	
Panchwania Mudhubani	70	400 kg each	100 kg oyster & 10 kg button & 50 kg dhudhiya	200 kg +1.5 kg spawn each	5 kg each	2.5 kg (60 family)	60q/ h	Adopted during 2015-16
Devna Bujurge Sitamarghi	45	Not required	50 kg Each 50 kg dhudhiya	300 kg each + 2.5 kg spawn each	4 kg each	-	-	Adopted during 2016-17
Baligargh Sitamarghi	30	Not required	50 kg each	300 kg each + 2.5 kg spawn	4 kg each	-	-	Adopted during 2016-17
Banka	35	-	100 kg oyster spawn	-	-	-	-	Adopted during 2016-17
Bhagalpur	15	-	30 kg oyster spawn	30 spawned bags	-	-	-	Adopted during 2016-17
Jamui	45	-	100 kg oyster spawn	-	-	-	-	Adopted during 2016-17

Inputs supplied to tribals presented in table 6.23. Result will be send after completion of crop in the month of March.

Table 6.24. Inputs supplied to Jail inmates

Name	Straw	Spawn	Button compost	Poly bags	Yield	Remarks
Samastipur	500 kg	50 kg Oyster	40.0 Q and 24 kg spawn	10 kg	-	Adopted during 2016-17
	300 kg	30 kg Dudhia			-	

Table 6.25. Inputs supplied to CRPF Camp

Name	Button compost	Poly bags	Yield	Remarks
CRPF Camp Muzaffarpur	Compost 40.0 Q and 24 kg spawn	5 kg		Adopted during 2016-17



किसान मेला सह भारतीय कृषि शिक्षा दिवस 2016



Tribals Training



TSP Training Programme



CRPF Camp, Muzaffarpur Training



TSP Training Programme



Training for students

Visit of Dr. P. S. Pandey,
ADG Education, ICARHigh Level ICAR
Committee VisitorsAnnual Conference and
National Symposium

Mushroom Day celebration



Mushroom Field Day Celebration



Mushroom Production Seminar in Khanwa, Nawada



Fig. 6.6. Extension activities and visits to AICRP-Mushroom, RAU, Pusa

Participation in Kisan Mela

- Participated in state level Kisan Mela at Dr.RPCA, Pusa December, 3-5, 2016.
- Exposure visit of 500 female under AICRP was done. Out of this 350 tribals women from Banka, Madhubani, Jamui

and Sitamadhhi was done during December, 3-5, 2016.

Visitors

- Farmers - 3308 farmers visited mushroom centres.

- Student – 3502 primary and middle level students visited mushroom centre under chief minister education exposé visit.

- VIPs visitors –

Dr. P. S. Pandey, ADG (Education), ICAR, New Delhi, visited mushroom centre on 3rd

December, 2016 and 18th December, 2016.

Dr. S. K. Sharma, Ex. Vice-Chancellor, Palampur University along with PRT member Dr. Nanawati, Jaipur visited mushroom centre on 16th December, 2016.

Ludhiana Centre

Extension Activities

Table. 6.26. Trainings organized, exhibitions, visits and TV/Radio Talk/News Column

Date	Venue	No. of participants
10-11.05.16	Training course on cultivation and processing of tropical mushrooms for rural farmers, PAU, Ludhiana.	30
21-24.06.16	Training on cultivation of flowers, fruits, mushrooms and vermicompost	07
23-24.06.16	Mushroom training course for Horticulture Supervisor Trainees, PAU, Ludhiana.	24
24.06.16	Mushroom training course for beldar/gardeners from Govt. College for Girls, Ludhiana	09
04.08.16	Monthly training camp of Kisan Club, PAU, Ludhiana	490
05-09.09.16	Mushroom training course for rural farmers, PAU, Ludhiana	60
24-28.10.16	Mushroom training course for rural farmers, PAU, Ludhiana	36
26-28.10.16	Mushroom training course on Integrated mushroom growing unit for HDO, DES, KVK scientists, PAU, Ludhiana	10
26-28.10.16	Training course on cultivation of mushrooms, village Raowal, Distt Ludhiana	22G
09.01.17	Integrated training course for farm women from village Mehraj, Distt. Bathinda	30G
14.02.17	Training course on mushroom cultivation and processing under Arya project organized by KVK, Bathinda.	26 M, 6 W
05-07.03.17	Training on mushroom, vinegar and biofertilizers production under scheme S.C.S.P (RKVY) in village Dewatwal, Ludhiana	11 M, 24 W
08-10.03.17	Training on mushroom, vinegar and biofertilizers production under scheme S.C.S.P (RKVY) in village Rudka Kalan, Kapurthala	32
05-07.03.17	Training on mushroom, vinegar and biofertilizers production under scheme S.C.S.P (RKVY) in KVK, Ropar	28
Total (14)		
<i>Exhibitions/Lectures</i>		
05.04.16	Lecture on mushroom cultivation technology for farmers of village Badal, Bathinda	
27.05.16	Exhibition for the visit of Union Minister of Agriculture at Pal Auditorium, PAU, Ludhiana	
30.05.16	Exhibition at Research and extension specialist workshop on vegetable, floriculture, sericulture, post harvest management, FPM, FT and Agril economics, PAU, Ludhiana	
08.09.16	Regional Kisan Mela at Ballowal	
12.09.16	Regional Kisan Mela at KVK, Amritsar	
14.09.16	Regional Kisan Mela at Faridkot	
16.09.16	Regional Kisan Mela at Rauni	
20.09.16	Regional Kisan Mela at Gurdaspur	
22-23.09.16	Kisan Mela at PAU, Ludhiana	
29.09.16	Regional Kisan Mela at Bathinda	
21-23.11.16	India International Trade Fair 2016 (14-27 Nov.), N. Delhi	
7.12.2016	Lecture to farmers on mushroom cultivation organized by PAMETI	

14.12.2016	Lecture to farmers on mushroom production and its processing organized by Food Processing Technology and Engineering Dept.	
22.12.16	Exhibition at Inauguration of Integrated Beekeeping Development Centre at PAU by Sh Arjun Ram Meghwal and Sh Vijay Sampla, Union Ministers, Govt of India	
21.02.17	Lecture-cum-visit to farmers on mushroom cultivation by KVK, SAS Nagar (Mohali) (5 M; 25 W)	
27.02.17	Exhibition at Research and extension specialist workshop on kharif crops, PAU, Ludhiana	
08.03.17	Regional Kisan Mela at Ballawal	
10.03.17	Regional Kisan Mela at KVK, Amritsar	
15.03.17	Regional Kisan Mela at Gurdaspur	
21.03.17	Regional Kisan Mela at Rauni	
24-25.03.17	Kisan Mela at PAU, Ludhiana	
28.03.17	Regional Kisan Mela at Bathinda	
Total (23)		
<i>Visits</i>		
12.04.16	Visit of Mushroom Research Center, PAU by farmers from Rajasthan	20
15.04.16	Visit of Mushroom Research Center, PAU by students from College of Agriculture, SKN Agri. Univ., Lalsot, Jobner	9G,30B, 2 faculty
18.04.16	Visit of Mushroom Research Center, PAU by Hort/.Agri. Trainees from KKG	11
27.04.16	Visit of Mushroom Research Center, PAU by students from College of Agriculture, SKN Agri. Univ., Bikaner	16G,31B, 2 faculty
17.06.16	Visit of the Deptt of Microbiology by The Nuffield Farming Scholars, Australia	10
12.07.16	Visit of the Director, DMR and Mushroom Consultant to Punjab Govt. and Principal Scientist, DMR, Solan	-
02.08.16	Visit of Mushroom Research Center, PAU by young farmers 115 batch under 'Young Farmer's training Course'	40
09.09.16	Visit of Mushroom Research Center, PAU by trainee farmers from KVK, Mukatsar	22
13.09.16	Visit of Mushroom Research Center, PAU by students from Victoria Public School, Lehra	15G;2 faculty
25.09.16	Visit of Mushroom Research Center, PAU by students from College of Agriculture, UAS, Mandya, Bengaluru, KA	18B,22G, 2 faculty
27.09.16	Visit of Mushroom Research Center, PAU by students from College of Agriculture, UAS, Raichur, KA	24G,54B, 2 faculty
27.09.16	Visit of Mushroom Research Center, PAU by farmers from Gujarat	15
27.09.16	Visit of Mushroom Research Center, PAU by students and faculty from College of Agriculture, Maharashtra	18B, 25G, 2 faculty
04.10.16	Visit of Mushroom Research Center, PAU by students from DAV school, Ludhiana	45B, 24G, 2 faculty
07.10.16	Visit of Mushroom Research Center, PAU by students from DAV school, Ludhiana	72B, 28G, 3 faculty
12.10.16	Visit of Mushroom Research Center, PAU by students from DAV school, Ludhiana	70B, 30G, 2 faculty
13.10.16	Visit of Mushroom Research Center, PAU by students and faculty from College of Agriculture & Polytechnic, Anand Agriculture University, Gujarat	20B, 25G,2 faculty
13.10.16	Visit of Mushroom Research Center, PAU by Young entrepreneur trainees from GNDEC, Ludhiana	16B, 04G, 2 faculty
13.10.16	Visit of Mushroom Research Center, PAU by students from CoA and Polytechnic in Agr., AAU, Vaso, KA	25B, 24G, 2 faculty
14.10.16	Visit of Mushroom Research Center, PAU by students from DAV school, Ludhiana	60B, 80G, 2 faculty

21.10.16	Visit of Mushroom Research Centre, PAU by trainee farmers from KVK, Mansa	18
24.10.16	Visit of Mushroom Research Centre, PAU by students from DPS school, Ludhiana	70B, 2 faculty
24.10.16	Visit of Mushroom Research Centre, PAU by students and faculty from Divine Public School, Ludhiana	40G, 28B, 2 faculty
24.10.16	Visit of Mushroom Research Centre, PAU by students from UBKV campus, Cooch Behar, West Bengal	20G, 35B, 2 faculty
11.11.16	Visit of Mushroom Research Centre, PAU by Young entrepreneur trainees from GNDEC, Ludhiana	25B, 04G, 2 faculty
11.11.16	Visit of Mushroom Research Centre, PAU by students from PCET, Ludhiana	05B, 20G, 2
23.11.16	Visit of Mushroom Research Centre, PAU by farmers from UP	10
24.11.16	Visit of Mushroom Research Centre, PAU by students and faculty from College of Forestry, UAS, Dharwad, KA	18G, 40B, 2 faculty
28.11.16	Visit of Mushroom Research Centre, PAU by students and faculty from Agri. College and Res. Institute, TNAU, Coimbatore, KA	82G, 17B, 3 faculty
05.12.16	Visit of Mushroom Research Centre, PAU by Scientists from Colorado under Colorado Agricultural Leadership Program, USA	17
19.12.16	Visit of Mushroom Research Centre, PAU by farmers from Bharmour, Distt. Chamba, HP	20
21.12.16	Visit of Mushroom Research Centre, PAU by students and faculty from Agril. Sci. and rural development, Nagaland University, Medzipherma	28G, 27B, 3 faculty
11.01.17	Visit of Mushroom Research Centre, PAU by students and faculty from IGKV, Raipur, Chhatisgarh	10G, 25B, 2 faculty
09.01.17	Visit of Mushroom Research Centre, PAU by farmers organized by PNB from village Mehrar	16W, 5M
12.01.17	Visit of Mushroom Research Centre, PAU by Management Trainees/Bank Officers from PNB	40
24.1.17	Visit of Mushroom Research Centre, PAU by farmers from Barsa, Dist Surat, Gujarat	17
03.02.17	Visit of Mushroom Research Centre, PAU by students and faculty from College of Agri, JNKVV, Rewa (MP)	19G, 34B, 3 faculty
13.02.17	Visit of Mushroom Research Centre, PAU by students from Khalsa College for Women, Ludhiana	119G
14.02.17	Visit of Mushroom Research Centre, PAU by students from Indira Gandhi Agricultural University, Raipur	6G, 12B
15.02.17	Visit of Mushroom Research Centre, PAU by farmers from Ganganagar, Rajasthan.	18M, 2W
21.02.17	Visit of Mushroom Research Centre, PAU by students from Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior	6G, 21B
22.02.17	Visit of Mushroom Research Centre, PAU by farmers from J&K.	15M
28.02.17	Visit of Mushroom Research Centre, PAU by students from MCM DAV College for Women, Chandigarh	30G
02.03.17	Visit of Mushroom Research Centre, PAU by staff members of ATMA group from Vidisha.	7M
03.03.17	Visit of Mushroom Research Centre, PAU by farmers from Sambha (J&K) under MIDH	22M
Total (45)		
<i>Seminar/Workshop</i>		
09-10.06.16	XVIIIth Annual Workshop of AICRP on mushrooms at DMR, Solan	
21-22.12.16	Research and extension specialist workshop on fruits, mushroom, agroforestry alongwith post harvest management, FPM, FT and Agril economics, PAU, Ludhiana	
<i>TV/Radio Talk/News Column</i>		
06.09.16	Khumban di kasht, AIR, Jalandhar	
08.09.16	Khumban di kasht, DDK, Jalandhar	
18.09.16	Gharelu padhar te khumban di kasht, DDK, Jalandhar	

Spawn supply

During the year 2016-17, 1420 kg mushroom spawn of *Agaricus bisporus*, *Calocybe indica*, *Pleurotus* spp. and *Volvariella volvacea* was supplied to the mushroom growers of Punjab.



Fig. 6.7. Extension activities at AICRP-Mushroom, PAU, Ludhiana

Barapani Centre

Extension Activities

Three trainings and Nine demonstrations/visit/lecture 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, University etc. **Mushroom day was also celebrated on 23.12.16.** Total spawn supplied till date is 713 kg, mother spawn 368 kg and 400 kg compost was also supplied to farmers. Total revenue generated till date is 91,674/-.

Table. 6.27. Training programmes at Barapani Centre

S. No.	Activity	Date	Duration	No. of Participants
1.	Mushroom cultivation and spawn production for women empowerment	14-20 July 2016	7 days	16
2.	Oyster Mushroom cultivation	07.12.16	1 days	58
3.	Oyster Mushroom cultivation	9-11 March, 2017	3 days	40

Industrial visit (30-31 January 2017): 30 students along with three faculty members came on Industrial visit related to Mushroom cultivation. Students were shown the bulk pasteurization unit and its functioning. Five students from Allahabad came for orientation training for six days (Mushroom cultivation and spawn production, 11-16 March 2017).

Mushroom day celebration

Mushroom day was celebrated on 23.12.16 in the Institute. Fourty participants attended the programme. Participants were apprised about health and nutritional benefits in great detail citing the beneficial effects of mushrooms in case of diabetes, cardiovascular diseases, cancer and other common diseases.

Participants were urged to include this “Super Food” in their diet. Many participants also expressed their views about how they consume mushrooms and which mushrooms and mushroom recipes they prefer. Posters related to nutritional value of different mushrooms,

health benefits, amino acid content etc. were also displayed for information of the participants and visitors. Programme was attended by 40 persons including scientists, technical staff, supporting staff, entrepreneurs and farmers from different villages.



Mushroom industrial Visit of students



National Mushroom Day celebration

Fig. 6.8. Extension activities of Barapani Centre

Table. 6.28. Demonstration/Visit/lecture

S. No.	Activity	Date	No. of Participants
1.	Oyster Mushroom cultivation and Shiitake	13.01.17	20
2.	Oyster Mushroom cultivation	28.11.16 and 29.11.16	4
3.	Oyster Mushroom cultivation and Shiitake	21.10.16	15
4.	Oyster Mushroom cultivation	8.06.16	14
5.	Oyster Mushroom cultivation in low cost mushroom house	30.04.16	2
6.	Shiitake cultivation (Off farm)	29.04.16	8
7.	Oyster mushroom cultivation	12.04.16	17
8.	Oyster mushroom cultivation (lecture)	27.01.17	Many farmers
9.	Oyster mushroom cultivation (lecture and demonstration)	02.03.17	Many farmers
10.	Oyster mushroom cultivation (lecture and demonstration)	14.03.17	Many farmers

Table. 6.29. Revenue generation (2016-17)

S. No.	Commodity	Quantity	Amount (Rs.)
1.	Spawn sale	713 (kg)	66,204
2.	Mother spawn	368 (kg)	5,520
3.	Fresh Mushroom	-	5,950
4.	Culture tubes	13 nos.	10,000
5.	Compost	400 (kg)	4,000
		Total	91,674

IIHR Bangalore centre*Extension & training*

- 101 people were trained on mushroom cultivation and spawn production at IIHR campus.
- Conducted one day mushroom cultivation training (25 members) in association with CHES, Chettalli in TSP on 2nd July 2016 at B. R. Hills, Karnataka.
- Conducted two day Mushroom cultivation training (25 members) on 17-18th August 2016 at KVK, Gonikoppa, Kodagu district, Karnataka.
- Given technical guidance to Freshbowl Horticulture Pvt. Ltd., Orvakal Mandal, Kurnool to establish a mechanized spawn lab on 1-2nd AUG 2016.
- Country's first Mushroom Startup Company named "Pluckfresh" formed by Mr. Kevin Cherian was launched on 24th Sept 2016 by Dr. Shashi Tharoor, Member of Parliament at Hotel Chanchery Pavillion, Bengaluru.
- National Mushroom Industry Interface Meet was conducted at ICAR-IIHR on 27th October 2016 at Lalbagh, Bengaluru, India in collaboration with Biotechnology centre, Department of Horticulture, Govt. Of Karnataka and Indian Mushroom Growers Association (IMGA), Bengaluru.
- ICAR-IIHR conducted a Workshop cum training program titled " Suitable vegetable varieties, mushroom production and value added products of fruits and vegetables for Tripura" at college of Agriculture, Lembucherra, Tripura on 19th March 2017 in coordination with Dr. Sukhen Chandra Das, Assistant Professor of the college as the organizing secretary.

Women empowerment

2949 Ready to fruit (RTF) bags were sold to rural and urban women to grow mushrooms at home as kitchen garden activity to enhance nutrition of daily diet.

Revenue generation

Revenue of Rs. 2504371 was generated by the mushroom lab from April 2015 to March 2016.

Spawn sold to farmers

36493 Kg (36.493 tons) of spawn was sold to the farmers

BCKV Kalyani Centre*Mushroom Training Programme Organized*

A mushroom training was imparted at Agricultural Training Centre, Kalyani, West Bengal to men from various districts. A total of 40 interested enthusiastic farmers participated in this training event. We received very positive feedback from involved people.

National Mushroom Day Celebrated: 23rd December, 2016

This day was celebrated in our campus with full fervor and gaiety with students and staff. They were given refreshments after briefing them about the methodology of mushroom cultivation.

Teaching and Outreach Programmes

- ❖ UG – IV year BSc., (Agri.) students were taught PPI 451 . Experiential Learning in Mushroom Production Technology 0+2 Course during VIII Semester 2014-15(RAWE program)
- ❖ PG – One M Sc., (Ag.) Plant Pathology student has been allotted work on *Pleurotus* mushroom.

Participation in the National / International Conferences

Participated in National Plant Pathology Conference, IPS held at ICAR, NEH- Region, Umiam, Shillong Meghalaya 09-11 Jan., 2017

Spawn distributed during 2016-17: 82 Kgs



Fig. 6.9. Extension activities at Kalyani Centre, West Bengal

Manipur Centre

Table. 6.30. On-campus and Off-campus training programmes

S.No.	Date	Venue	No. of participants	Particulars	No. of lady participants
1	26-28 April, 2016	ICAR Manipur Centre	32	Mushroom cultivation as a secondary source of income for Jumias	16
2	28-30 June 2016	ICAR Manipur Centre	14	Scientific cultivation of Oyster Mushroom	10
3	13-15 Sept. 2016	Ijeirong village, Tamenglong Distt.	87	Scientific cultivation of Oyster Mushroom	36
4	7-8 Nov. 2016	Tului Village Ukhrul distt.	42	Scientific cultivation of Shiitake Mushroom	25
5	22-23 Dec. 2016	Ukhrul distt.	34	Scientific cultivation of Oyster and Shiitake Mushroom	19
6	23 Dec 2016	ICAR Manipur Centre	41	National Mushroom day	15
7	24 January 2017	Chandanpokpi Village Chandel distt.	23	Scientific cultivation of Oyster Mushroom	20
8	27 Feb- 1 March 2017	ICAR Manipur Centre	27	Scientific Mushroom Cultivation	
9	9-11 March 2017	Guigailong Village Imphal west	36	Scientific cultivation of Oyster Mushroom	36
10	20-21 March 2017	Koirengei, Imphal East	36	Scientific cultivation of Oyster Mushroom	18
11	20-21 March 2017	Wangkhei Imphal East	36	Scientific cultivation of Oyster Mushroom	18
12	22-23 March 2017	Leimakong Imphal west	22	Scientific cultivation of Oyster Mushroom	13
13	21-23 March 2017	Khurkhul Imphal West	36	Scientific cultivation of Oyster Mushroom	31
14	21-23 March 2017	Chandanpokpi village Chandel District	31	Trainings cum Demonstrations on Mushroom Production and Value Addition	24
15	27-28 March 2017	Porompat, Imphal East	35	Scientific cultivation of Oyster Mushroom	17
Total			532		298 (56.02%)

Demonstration at farmer's field

1. A Demonstration on Oyster Mushroom Production at Chandanpokpi village, Chandel, district.
2. A Demonstration on Oyster Mushroom Production at Guigailong village, Imphal West, district.

Field Day: Four field days

Farmer Scientist Interactions: 10

Consultancy Services

Consultancy services on various aspects of spawn production, mushroom cultivation, pests and disease management and post-harvest processing were provided to different mushroom farms: (i) Integrated Mushroom Association, (ii) M/s Pureiromba Enterprises, Imphal East, (iii) RNBA, Imphal West, (iv) Rama Foundation, Imphal West, (v) Universal Mushroom Club, Imphal West, (vi) NupiTengbangLup, Imphal West, (vii) M/s Sana Leibak Mushroom Farm, Imphal West, (viii) The Sarah's Self Help Group, Imphal West and to small scale mushroom growers.

Experiential learning programme

Three days session on "Mushroom Cultivation: Theory and Practical" for RAWE students during 27th Feb-1st March, 2017 at ICAR, Manipur Centre

Spawn Production and Supply

During the year quality spawn was produced and supplied to different stakeholders. A total of 805.2 kg of *Pleurotus* spawn and 319 kg of shiitake spawn were produced.

Celebration of 'National Mushroom Day' Celebration at ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal-795004

ICAR-Directorate of Mushroom Research, Solan has declared 23rd December as National Mushroom Day to highlight the importance of mushrooms for nutrition and health benefits. On this occasion, ICAR Research Complex for

NEH Region, Manipur Centre has published an article in local Newspaper 'Sangai Express' highlighting the nutritional and health aspects of mushrooms.

On 23rd December, 2016 ICAR Research complex for NEH Region, Manipur Centre, Lamphelpat, Imphal celebrated 'National Mushroom Day'. Mr. S.C. Srivastava, General Manager, NABARD, Imphal, Mr. RK. Yaiphaba, AGM, NABARD, Imphal and Dr. M. Mahendra Singh, Retd. Professor RIMS graced the function as Chief Guest and Guests of Honour with Dr. N. Prakash, Joint Director of ICAR RC NEH, Manipur Centre as President. During the year 2016, ICAR Research Complex for NEH Region, Manipur Centre has successfully facilitated in establishing a mushroom growers company "SidayaiChengum Producer Company Limited" with the support of NABARD. At present company has 900 growers as members and is expanding.

In the occasion of 'National Mushroom Day', the official logo of the "SidayaiChengum Producer Company Limited" was unveiled. A small exhibition was arranged and a discussion on "Mushrooms for nutrition and health" was also conducted. About 40 mushroom growers and producers participated in the occasion and deliberated on the importance of mushrooms as quality foods and the scope and potential of mushroom cultivation. On this occasion, Temperate Mushroom Centre, Bimita Mushroom Centre and Integrated Mushroom Production Centre were adjudged first, second and third in the exhibition of mushroom and value added products.

Visit of Dr. V.P. Sharma, Director ICAR-Directorate of Mushroom Research and Dr. Shwet Kamal, Senior Scientist and Scientist Incharge, AICRP-Mushroom to ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal during 29-30 Oct, 2016

Dr. V.P. Sharma, Director ICAR-Directorate of Mushroom Research and Dr. Shwet Kamal, Senior Scientist and Scientist Incharge, AICRP-Mushroom visited ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal. They visited Plant Pathology Laboratory, Mushroom Laboratory, Central Laboratory and Exhibition Hall and mushroom cropping rooms of ICAR Research Complex for NEH Region, Manipur Centre. There was a detailed discussion of various activities being undertaken under AICRP-Mushroom at ICAR RCNEH Manipur Centre.

They also visited different mushroom farms/spawn laboratories in Manipur. They visited (i) spawn laboratory of Mr. Sh. Ibohah Sharma at Thangmeiband Thingel Leikai, P.O. Lamphel, P.S. Imphal, Imphal West, (ii) Eastern Mushroom Industry, Nungoi Awang Leikai, Imphal East and (iii) HeeYai Mushroom Farm at Bashikhong, Kitnapanning, Imphal East. During visits, there were detailed discussion with the growers and they were advised on different aspects of mushroom growing and insect-pests, disease management.





Fig. 6.10. Extension activities at Manipur centre

Meerut Centre*Training*

One trainings were conducted in month of March 2017 for skill development at KVK

Baghara with association of mushroom lab meerut in March 2017 for rural Youth

Unit Establishment/Demonstrations

Table. 6.31. Five Units were established for oyster/milky mushroom production as per following detail

S.N.	Mushroom Grower	Place	Mushroom Type
1.	Mrs Kalpana	Meerut	Oyster
2.	Devashish Rana	Meerut	Oyster
3.	Vikram Singh	Muzaffarnagar	Oyster
4.	Buddh Prakash	Muzaffarnagar	Milky
5.	Mrs. Poonam	Meerut	Oyster

Mushroom Museum has been started in one room in mushroom laboratory from December 20017.

Experiential learning

12 undergraduate students participated in experiential learning programme on

Mushroom production technology during IIInd Semester 2016-17

Table. 6.32. Resource Generation Activity (2016-17)

Mushroom sold / Produced	168 kg
Commercial Mushroom spawn sold / Produced	252 kg
Mushroom Culture Tube	02
Number of Spawn Purchaser	32
Visitors (farmers) of Mushroom Lab	79
Advisory Service to Mushroom Growers	71

Table. 6.33. Invited Lectures on Mushroom Production in Kisan Gosthi/Divas/Mela (2016-17)

Date	Place	Organiser
11.04.16	Govindpuri (Ghaziabad)	IIFCO
30.05.16	Pilakhua (Hapur)	SVPUA&T/UPCAR
20.05.16	Jarothi (Hapur)	SVPUA&T/UPCAR
21.05.16	Lalpur (Hapur)	SVPUA&T/UPCAR
22.06.16	Rampur	KVK, Rampur
22.09.16	Meerut	Agriculture Department
05.10.16	Meerut	SVPUA&T
18.10.16	Meerut	Agriculture Department
16.10.16	Rampur	KVK
29.11.16	Noida	Noida International University
11.12.16	Baghra	KVK
26.02.17	Kharad (Shamli)	17 Garhwal Rieffels
06.03.17	Baghra	KVK
08.03.17	Baghra	KVK



Training of Mushroom Production to Women



Experiential learning programme on Mushroom Production for UG students (2016-17)

Fig. 6.11. Extension activities at Meerut centre

Nagaland Centre

National Mushroom day celebration

ICAR Research Complex NEH Region, Nagaland Centre observed the “**National mushroom day**” on 23rd December, 2016 at ICAR research Complex Nagaland Center, Medziphema. The state of Nagaland is having a large scope for the recycling the paddy waste for the mushroom cultivation by utilising these wastes for growing mushrooms to enhance income and impart higher level of sustainability of rural poor. ICAR Research Complex, Nagaland Centre has been putting the sincere effort towards the improvement of livelihood and nutritional security by

promoting the mushroom cultivation for the rural youths and women self-help groups. During the mushroom day celebration programme, an awareness about the Importance of mushroom in human diet and its nutritional and medicinal importance in the human diet for all age group people. During the occasion the Joint Director, Dr. D. J. Rajkhowa felicitated a young innovative spawn producing entrepreneur **Mr. Rajib Mondal** from Dimapur, Nagaland for commercial production of mushroom spawn for the benefit of mushroom growers of Nagaland and to mitigate the problem of spawn availability.



Fig. 6.12. Joint director Dr. D. J. Rajkhowa felicitated the young mushroom entrepreneur

Success story

Entrepreneurship development through spawn production and mushroom cultivation

Mushroom cultivation is a commercial enterprise for small and marginal farmers of Nagaland for increasing the income and livelihood security. Cultivation of oyster mushroom round the year give an impact of profitable agri-business for the rural poor. A young innovative spawn producing as well as mushroom producing entrepreneur, **Mr. Rajib Mondal** from Dimapur, Nagaland

practicing the mushroom cultivation in large scale. Now he is able to supply the spawn packets for the farmers of Nagaland on payment basis.

Spawn and mushroom produced

The spawn packets have been producing at ICAR Research Complex for NEH Region, Nagaland centre, Jharnapani under the project to supply the quality spawn for the farmers of the Nagaland and other states to fulfil the demand and increase the production of the mushroom in Nagaland state.

Table. 6.34. Production of spawn and mushroom during 2016-17

Sl No.	Particulars	Production	Revenue generated (Rs.)
1	Spawn (200 gm)	5030 packets	1,41,855.00
2	Mushroom	22.7 kg	2,270.00
3	Spawn culture	1 tube	600.00
4	Total		1,44,725.00

Activities carried out under TSP

The training and demonstration were conducted for the farmers of the Nagaland to promote the recycling of waste generated under field condition and nutritional security small and marginal farmers. Under TSP, some of the inputs were also distributed for the participants of the training programme and practicing farmers. For the participants, spawn and hand sprayers were distributed after the

training programme whereas some disinfectant and water drums were also distributed for the mushroom cultivating farmers.

Four mushroom cultivation units were established at farmer's field of Dimapur, Peren, Wokha and Longleng districts of Nagaland.

Training and demonstration conducted

The training programme on cultivation of oyster, milkey, paddy straw and shiitake mushroom were given for the farmers of the

Nagaland and Arunachala Pradesh. The training programmes were on farm and off farm based on the interest of the farmers for the SHG, women and unemployed youths. The

following training cum demonstration were conducted during the period at different time period by targeting 405 participants.

S. No	Title of the training programme	Date/period	No. of days	No. of participants	Project Name	Venue	
1.	Hands on training on Mushroom Cultivation	Oct. 13-14, 2016	2	34	AICRP on Mushroom	Poilwa village	Peren
2.	Entrepreneurship development through Mushroom cultivation	Dec. 7, 2016	3	30	Sponsored by ICAR DMR Solan	ICAR, Nagaland center	Dimapur, Pasighat-Arunachal Pradesh
3.	National mushroom day and Training cum demonstration on mushroom cultivation	23 rd Dec., 2016	1	27	AICRP on Mushroom	ICAR, Nagaland center	Dimapur, Peren
4.	Training of oyster mushroom production	20.01.17	1	41	NMSHE	Mongtikang village	Longleng
5.	Demonstration of oyster mushroom production	20.01.17	1	41	NMSHE	Mongtikang village	Longleng
6.	Training cum demonstration on mushroom cultivation	06.01.17	1	27	AICRP on Mushroom	ICAR, Nagaland center	Peren, Kohima, Dimapur
7.	Oyster mushroom cultivation Technology: A source of income generation for marginal and small farmers	January 19-21, 2017	3	21	AICRP on Mushroom	ICAR, Nagaland center	Peren, Dimapur
8.	Oyster mushroom cultivation Technology	29.03.17	1	66	AICRP on Mushroom	Jalukie town	Peren
9.	Oyster mushroom cultivation Technology	30.03.17	1	54	AICRP on Mushroom	Kohima town	Kohima
10.	Oyster mushroom cultivation Technology	30.03.17	1	37	AICRP on Mushroom	Samtangtilla village	Dimapur
11.	Mushroom cultivation Technology	31.03.17	1	25	TSP	KVK Wokha	Wokha





Fig. 6.13. Extension activities at Nagaland centre

Palampur Centre

So far during the current year, **40 Qtls** of mushroom spawn was prepared and sold apart from this **30 tonnes** of mushroom compost and fresh mushroom **400 kg** have been prepared and sold. One off-campus training camp was organised on 06.09.2016 at village Dub in Khaira block of district Kangra, in which 15 women participated. During the camp lectures were delivered on button mushroom and Dhingri cultivation, the farmers were made

aware about the importance of mushrooms, medicinal value and and practical on cultivation of dhingri. The participants were demonstrated practically how to prepare the substrate, spawning, filling of pp bags and up keep of Dhingri bags for spawn run. They were also demonstrated the compost bags of button mushroom and application of casing soil after spawn run and thereafter the growing conditions and upkeep of bags in their growing room. Frequent follow-up visits are also made in the village for feedback from the trainees.

Pantnagar Centre

Table. 6.36. Seven trainings conducted and 197 Nos. Partipants had attended

Duration	Participants	Subject	Remarks
09.04.2016	32	Mushroom production	One day training at selected villages of Kalsi & Chakrata block Dehradun
10.04.2016	35	Mushroom production	
11.04.2016	30	Mushroom production	
12.04.2016	33	Mushroom production	
13.04.2016	30	Mushroom production	
Sept. 20-24,2016	48	Mushroom production	Organized at MRTC, Pantnagar
Jan 17-20, 2017	19	Mushroom Production	Organized at MRTC, Pantnagar
Mar. 24-25, 2017	30	Mushroom Production	Organized at MRTC, Pantnagar
Mar. 29-30, 2017	35	Mushroom Production	Organized at MRTC, Pantnagar
Mar. 30-31, 2017	40	Mushroom Production	Organized at MRTC, Pantnagar
Total participants	302		





Fig. 6.14. Extension activities at Pantnagar centre

Demonstration: Oyster mushroom demonstration trial laid down at farmer's field

Seminar/workshop/training attended

- Annual workshop of All India Coordinated Crop Research Project on Mushroom held at DMR, Chambaghat, Solan on June 09-10, 2016.
- Three day training on Mushroom Taxonomy held at DMR, Chambaghat, Solan on June 11-13, 2016.
- *Kisan mela:* Kisan Mela is being organized during Oct. 17-20, 2016 and March 04-07, 2017.

Table. 6.37. Spawn supply

Comm. Spawn (Kg)			Master spawn (No.)			Cultures tube (No.)			Compost (Ton)	Casing soil (Qtl)
Button	Oyster	milky	Button	Oyster	milky	Button	Oyster	milky		
1026.5	851	283	47	13	3	7	12	5	486.5	28.6
2160.50 kg			63 No. bottle			24 No. tube				

Museum: Mushroom Museum has already been developed at the centre and is being updated time to time

Pasighat Centre

During the year 2016-17, fourteen training programme including (on campus / off campus) on cultivation of Oyster mushroom and spawn production with a total 460 trainees (374 Female + 86 Male trainees) have been trained at Pasighat center. Four times consultancy on mushroom as well as spawn production was also provided to visitors are coming from different places of Arunachal Pradesh. Two times our exhibits are also display in various places of North Eastern Region of India. Throughout exhibit total of 5000 persons (3250 Female + 1750 Male persons) were aware mushroom and few are taken knowledge regarding how we can cultivate mushroom in this condition or which mushroom. In addition, on the date of 23rd December, 2016 the center was also celebrating a **National Mushroom Day**. Besides, one TV

talk programme was under taken during the period on mushroom cultivation and spawn production techniques. The TV talk programmes were also telecast by the channel DD Kisan, Itanagar. The project in charge also participated in 20 times farmers' scientist interaction programme at various places. The student's strength is Seven B.Sc. (Hort.) Final Year and Four B.Sc. (Ag.) Final Year (Ist Batch) were also trained for spawn production and cultivation of oyster mushroom under the experiential learning and READY programme: Mushroom production. Spawn production was increased over period of time. It was about 400 kg spawn sold to the growers. One hundred kg of fresh mushrooms are sold from our unit. Monthly visited the progressive Mrs. Oti Sitang, Mr. T. Tali, Mrs. Osing Taboh and Mr. Bijoy Koirala production unit. Sixteen another farmers are started mushroom production unit

at different places of Arunachal Pradesh. In addition that, our University got the project from ICAR, New Delhi, in titled *“Enhancing Socio-Economic Status and Livelihood Security of Tribal Farmers' of North East Hill States through Agricultural Intervention”* Total Budget of this project is Rs. 5. 29 (Rupees five Crore twenty nine lakhs only) and beneficiary states such as, Arunachal Pradesh, Manipur, Meghalaya, Mizorum, Nagaland). The state wise budget of Arunachal Pradesh is Rs. 105.81 (Rupees one Crore five lakh and

eighty one thousands only) for the development of above said states of tribal community. Hence, under this project the PI of AICRP on Mushroom were also look after and given the details for construction of low cost mushroom houses, cultivation of oyster mushroom and supply of spawn from our unit at fifteen villgae of three district of Arunachal Pradesh. In view of that, fifteen new mushroom production unit are also functioning in well manner.

Table. 6.38. On campus/off campus training programmes

S. No.	Date	Venue	Particulars	No. of participants	No. of Female participants	No. of Male participants
1.	5 th May 2016	College Campus	Oyster mushroom cultivation and Spawn Production technology	10	10	-
2.	21 st June 2016	Berung	Oyster mushroom cultivation	50	40	10
3.	25 th June 2016	GTC Pasighat	Oyster mushroom cultivation	60	45	15
4.	12 th July 2016	KVK East Siang Pasighat	Oyster mushroom cultivation	35	33	02
5.	17 th -26 th August 2016	College Campus	cultivation spawn production and processing of Oyster mushroom	35	33	02
6.	14 th December 2016	Old Deka	Oyster mushroom cultivation	35	30	05
7.	30 th January 2017	College Campus	Oyster mushroom cultivation	15	09	06
8.	9 th -10 th February 2017	College Campus	Spawn Production technology	20	16	04
9.	13 th February 2017	Berguli	Oyster mushroom cultivation	70	60	10
10.	14 th February 2017	College Campus	Oyster mushroom cultivation	10	06	04
11.	16 th February 2017	College Campus	Oyster mushroom cultivation	15	10	05
12.	25 th February 2017	College Campus	Oyster mushroom cultivation and spawn production technology	10	02	08
13.	26 th February 2017	Detak	Oyster mushroom cultivation	35	25	10
14.	17 th March 2017	College campus	Oyster mushroom cultivation	60	55	05
Total				460	374	86

Table 6.39. Consultancy on cultivation and spawn production of oyster mushroom

S. No.	Date	Name of visitors
1.	23 rd May 2016	Two (One family from Barpeta, Assam)
2.	1 st December 2016	Three person (Lekhabali, Arunachal Pradesh)
3.	6 th December 2016	Two person (Geku, Arunachal Pradesh)
4.	7 th December 2016	Two person (Norlung, Arunachal Pradesh), Two person (General Hospital, Pasighat)

Table. 6.40. Participation in Agri Expo, Kisan mela, exhibitions and fairs etc

S. No.	Date	Venue	Particulars	No. of visitors	No. of Female visitors	No. of Male visitors
1.	9 th -14 th September 2016	Solung Ground	Cultivation, spawn and processing of oyster mushroom	4000	2500	1500
2.	21 st -22 nd January 2017	College Campus	Cultivation, spawn and processing of oyster mushroom	1000	750	250
	Total			5000	3250	1750

Table. 6.41. Supply of quality spawns to mushroom growers

S. No.	Year	Amount of spawn sold in (kgs)
1	2009-10	100
2	2010-11	70
3	2011-12	146
4	2012-13	212
5	2013-14	454
6	2014-15	250
7	2015-16	400
8	2016-17	382

Table. 6.42. Fresh mushroom sold

S. No	Year	Mushroom sold in (kgs)
1	2012-13	19.4
2	2013-14	16.0
3	2014-15	15.0
4	2015-16	10.0
5	2016-17	20.5

Spawn production was improved over period of time. It was regarding 382 kg sold to the growers and 20 kg fresh mushrooms sold from our unit during the year 2016-17.

Feedback on diseases of respective areas

Monthly visited the progressive farmers Mrs. Oti Sitang, Mr. T. Tali, Mrs. Osing Taboh and

Mr. Bijoy Koirala production unit. Three another farmers also had started mushroom production unit at different places of Arunachal Pradesh.

On campus/off campus training programmes



Fig. 6.15. Extension activities at Pasighat centre

Launching of CAU-Tribal Sub Plan Project

"Enhancing Socio-Economic Status and Livelihood Security of Tribal Farmers of North East Hill States through Agricultural Intervention"

Total Budget: Rs. 5. 29 (Rupees five Carore twenty nine lakhs only) and beneficiary states such as, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland).

Ranchi Centre

Farmers training: Five days residential training programme under AICRP on Mushroom under TSP sponsored by Directorate of Mushroom Research, Solan was conducted at the Centre from dated 15.11.2016-19.11.2016. The total 27 beneficiaries were benefitted under the training programme (Fig. 5). During the training programme, two Scientist from DMR, Solan

were delivered lecture on recent technology in production of mushroom. After completion of the training, all the beneficiaries were benefitted with a mushroom kits which includes Mushroom spawn, PP bags, Master Tray, Formalin, Fungicides and mushroom booklets. Besides of these, more than 239 students also visited and got hands on training on oyster mushroom cultivation at the Centre.

Mushroom Diwas Celebration at the Centre

On the occasion of 'Mushroom Day' on Mushroom for nutrition and health and hand on training on oyster mushroom was celebrated and trained successfully on dated December 23, 2016 at ICAR- Research Complex for Eastern Region, Research Centre Ranchi, Jharkhand. Celebration ceremony and hand on training formally inaugurated by the inaugural address of Dr. Dr. A. K. Singh, Head, ICAR-RCER RC Ranchi. He discussed about the importance of mushroom in our health and nutrition. He also appeals to the gathering to go and cultivate mushroom for getting high quality protein in the diet. In his lecture he appeals to the weaker

section of the society to come and join in cultivation of mushroom which have highest benefit cost ration among all the existing crops, fruits and vegetables in very short period of time. After his lecture, three successful Mushroom entrepreneurs of Ranchi and Jamshedpur also addressed the gathering about the potential of mushroom to start-up as a enterprise. Mrs. Jhilmil Prasad, Mycelialabs, Ranchi given emphasis about quality mushroom spawn in enhancing productivity of mushroom. Mr. Shubham Modi, an emerging entrepreneur of Eastern region who given emphasis on composing and button mushroom cultivation. Then after Mr. Sanjeev Mathur, given emphasis on oyster mushroom cultivation and their post harvest management. In the end vote of thanks was given by Dr. R. S. Pan, Principal Scientist, ICAR-RCER Ranchi. Myself Dr. Sudarshan Maurya, given hands on training on mushroom cultivation to the growers and aspirants of Ranchi, Jamshedpur and Simdega. After completion of the training distributed the spawned bags of oyster mushroom among the growers and aspirants.



Fig. 6.16. Extension activities at Ranchi centre

Table. 6.43. A total student visited during 2016-2017: 239 (189 Female and 50 Male students and Farmers)

S. No.	Exposure visit	Dated	No of Beneficiaries
1	Knowledge awareness and demonstration of Mushroom cultivation (St. Xavier College, Ranchi)	September 15, 2016	25 (20 Female and 05 Male)
2	Knowledge awareness and demonstration of Mushroom cultivation	October 10, 2016	34 Female
3	Mushrooms and their production Technology	November 15, 2016	30 (22 Female and 8Male)
4	Hands on training on Oyster Mushroom cultivation	December 23, 2016	80 (76 women, 4 Male)
5	Mushrooms and their production Technology (Marwadi College)	December, 2016	45 (all female)
6	Mushrooms and their production Technology (Student of 'St. Paul College)	February, 2016	25 (all female)
Total Beneficiaries			239

Sikkim Centre

The ICAR-NOFRI formerly ICAR-Research Complex for NEH Region, Sikkim Centre, Tadong, Gangtok organized day long programme on '**Organic Oyster Mushroom Cultivation**' for the tribal farmers of South Sikkim under the aegis of Tribal Sub Plan during 3rd May, 2016. This programme is being organized with the aim to acquaint the farmers on organic oyster mushroom production and postharvest management techniques to ensure the livelihood sustenance of the resource poor farmers. 50 nos. of farmers from Upper and Lower Sadam participated representing four SHGs. Scientists from ICAR Sikkim Centre delivered lectures on organic oyster mushroom production, pest and disease management and post harvest production of mushroom.

One day '**Hands on Training on Quality Spawn Production in Oyster Mushroom for Livelihood Improvement of Tribal Farmers of Sikkim**' under the aegis of AICMIP-TSP-Mushroom on November 19, 2016 organized at ICAR- National Organic Farming Research Institute, Tadong, Gangtok. This programme was organized with the aim to train the women farmers on spawn production, mushroom cultivation, and post-harvest management techniques of oyster mushroom to improve livelihood and nutritional security of the

resource poor tribal farmers. A total of 10 women farmers from South Sikkim were trained on various aspects of mushroom cultivation in this training programme.

During the technical session, Dr. R.K. Avasthe, Joint Director detailed the 'mushroom production in Sikkim- an overview'; Dr. Ashish Yadav, Senior Scientist (Horticulture) discussed on the 'post-harvest management in mushroom'; Dr. R. Gopi, Scientist (Plant Pathology) detailed on 'disease management in organic mushroom cultivation, tissue culturing, mother spawn and bed spawn production *etc.*'; Dr. N. Johnson Singh, Subject Matter Specialist (Plant Protection) delivered lecture on 'insect pest management in mushroom production'. Farmers themselves were allowed to participate in oyster mushroom spawn production under the supervision of scientists from ICAR NOFRI. Besides training, the necessary inputs like mother spawn, polythene envelopes and other ingredients required for mushroom spawn production were distributed to the trainees. Farmers expressed their satisfaction and showed eagerness of undertaking mushroom.

Farmers from Arunachal Pradesh were trained on Organic mushroom cultivation at ICAR-NOFRI during November 6-8, 2016 as a part of Three day training on Livelihood security

through organic vegetables and spice cultivation under Tribal Sub Plan.

National Mushroom Day was also observed on December 23, 2016. Total of 63 nos. of progressive farmers from Khamdong GPU, East Sikkim participated in the program. On the eve of National Mushroom Day, Dr. R.K. Avasthe, Joint Director, ICAR-NOFRI, detailed the nutritional and health benefits of mushrooms and its biodiversity available in Sikkim. Dr. N. J. Singh, SMS (Plant Protection) KVK East Sikkim presented the mushroom spawn production to encouraged agri-entrepreneurial ability to the farmers during National Mushroom Day program. Besides training, the necessary inputs like mother spawn, polythene envelopes and other ingredients required for mushroom spawn production were distributed to the trainees.

In continuation of observation of Jai Kisan-Jai Vigyan week, two-day Training cum Awareness Program on 'Organic Crop Production' was organized for the Tribal Farmers of Assam Lingzey under TSP project by the ICAR-National Organic Farming Research Institute, Tadong, Gangtok in collaboration with ICAR-KVK East Sikkim during December 27-28, 2016. During the TSP training program, a total of 48 nos. of progressive farmers participated in the program. Mushroom production technology was also detailed during the program and mushroom spawn, polythene envelopes and other ingredients required for mushroom spawn production were distributed to the trainees.

Similar program was also organized at Namphok, South Sikkim during January 5-6, 2017 in order to create awareness and self-reliance in organic crop production. A total of 78 nos. of progressive farmers participated in the program. During the program mushroom production technology was also detailed and mushroom spawn, polythene envelopes and other ingredients required for mushroom

spawn production were distributed to the trainees.

The ICAR-NOFRI Tadong organized consecutively two 'Training-cum-Awareness Program on Organic Crop Production' for progressive tribal farmers of Thanka-Martam and Khamdong, East Sikkim on March 06, 2017 at ICAR-NOFRI, Tadong and at upper Pabong Village, South Sikkim during March 7-8, 2017 under Tribal Sub Plan (TSP). During the program a total of 38 tribal farmers from Thanka-Martam and Khamdong, East Sikkim and 61 farmers from upper Pabong Village, South Sikkim representing different Self Help Groups (SHGs) attended the program and benefited with the technical know-how and various inputs distributed *viz.*, organically permitted bio-pesticides, bio-fungicides, bio-fertilizers, untreated seeds, and plastic sheets for low cost plastic tunnels and shelters. During the program mushroom production technology was also detailed and mushroom spawn, polythene envelopes and other ingredients required for mushroom spawn production were distributed to the trainees.

The ICAR-NOFRI, Tadong organized 'Training-cum-Awareness Program on Organic Crop Production' for progressive tribal farmers of Lingchom, Tikjek, West Sikkim during March 24-25, 2017 under Tribal Sub Plan (TSP) and Mission for Integrated Development of Horticulture (MIDH-Vegetable) project. During the two-day program, a total of 133 farmers representing different Self Help Groups (SHGs) attended the program and benefited with the technical know-how and various inputs distributed *viz.*, organically permitted bio-pesticides, bio-fungicides, bio-fertilizers, untreated seeds, and plastic sheets for low cost plastic tunnels and shelters. During the program mushroom production technology was also detailed and mushroom spawn, polythene envelopes and other ingredients required for mushroom spawn production were distributed to the trainees.

Spawn production: 5 quintals



Fig. 6.17. Extension activities at Sikkim centre

Udaipur Centre Training Programme

Table. 6.44. On Campus Training programme held from April 2016 to March 2017

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1	27-04-2016 to 29-04-2016 Three day	Oyster	Entrepreneurs 6	Post:-Bhawa, Teh.. & Distt:-Rajsamand
2	18-05-2016 to 20-05-2016 Three days	Oyster & Milky	Farmers 5	21, Bohra Ganesh Ji colony, Dhool kot chouraha, Udaipur
3	20-06-2016 to 22-06-2016 Three days	Oyster & Milky	Farmers 09	Chikalwas, Badgon, Udaipur
4	06-07-2016 to 08-07-2016 Three days	Oyster & Milky	Farmers 10	Paliwal General Store, Udaipur Road, Fatahnagar
5	12-07-2016 to 14-07-2016 Three days	Oyster & Milky	Entrepreneurs 11	Kothariya, Rajsamand
6	20-07-2016 to 23-07-2016 four days	Oyster & Milky	Entrepreneurs 20	Block-13, Flat -75, HWP(K) colony, Rawat bhata

7.	26-07-2016 to 28 -07-2016 Three days	Oyster	Entrepreneurs 10	24, Pratap ji ki Bari, Jhadol, Udaipur
8.	10-08-2016 to 12 -08-2016 Three days	Oyster	Entrepreneurs 11	Near Moya Chouraha, Badi
9.	08-09-2016 to 10 -09-2015 Three days	Oyster	Entrepreneurs 09	Rampura Chouraha, Udaipur
10	15-09-2016 to 19 -09-2016 five days	Oyster	Entrepreneurs 13	Village:-Devla, Post:- Kothra Udaipur
11.	04-10-2016 to 06 -10-2016 Three days	Oyster & Button	Entrepreneurs 30	ATMA:- Ajmer,
12.	14-11-2016 to 16 -11-2016 Three days	Oyster & Button	Entrepreneurs 20	Lisode ki choki, Raiban, Tonk
13.	04-12-2016 to 06 -12-2016 Three days	Oyster & Button	Farmer 40	V/P Ajoli, Ajmer
14.	18-12-2016 to 20-12-2016	Oyster & Button	Farmer 25	Deepmala , Ramnagar, Surat
15.	3-01-2017 to 5-01-2017 Three days	Oyster	Farmer 32	Neem ka Thana, Sikar
16.	10-01-2017 to 14 -01-2017 Three days	Oyster & Button	Farmer 10	Teh:- Bhim, Rajsamand
17	6-02-2017 to 9-02-2017 Three days	Oyster	Farmer 30	ATMA, Jhalor
18	13-02-2017 One days	Oyster	Farmer 48	Sadri, Rajsamand
19	20-02-2017 to 22 -08-2-2017 Three day	Oyster	Farmer 26	ATMA-Jhalor
20	27-02-2017 One day	Oyster	Farmer 10	Village:-Tafhahedi, Alwar
21	1-03-2017 to 5-03-2017 Five day	Oyster	Farmer 30	ATMA:- Mandsor, M.P.
22	15-03-2017 to 17 -03-2017 Three day	Oyster	Farmer 10	S.20/385 Pratapnagar, Bhilwara
23	24-03-2017 One day	Oyster	Farmer 15	New Keshav nagar, Udaipur
24	10-04-2017	Oyster	Farmer 20	Badi, Udaipur
			Total:- 450	

Table. 6.45. Lectures in Summer School & Winter School

S.No.	Date & duration	Type of Mushroom	No. of Trainees	Native of Trainees
1	9-08-2017 One day	Oyster, Button & Milky	27	CTAE, Udaipur
			Total: - 27	

Table. 6.46. Awareness Camp

S. No.	Date & Duration	Type of Mushroom	No. of Trainees	Native of Trainees
1	10-04-2016 One day	Oyster	Farmers 10	H.M. Sec:- 4, Udaipur
2	20-04-2016 One Day	Oyster	Farmers 35	Bhuvana road, Udaipur
8	30-07-16 One Days	Oyster	Farmer 20	5, new channer nagar, Ajmer
9.	7-08-16 One Days	Oyster	Farmer 25	Lambiya Station, Baneda, Bhilwara
10	15-08-16 One Days	Oyster	Farmer 30	Bedla road, Udaipur
11.	30-09-16 One Days	Oyster	Farmer 35	PG Nagar, Hadecha Road, Sachore, Jalore

12	10-09-16 One Days	Oyster	Farmer 40	Teh:- vallabh nagar
13	17-10-16 One Days	Oyster	Farmer 45	709, Arjun nagar, Sec-11
14	19-10-16 One Days	Oyster	Farmer 50	Rajban, Tonk
15	24-11-16 One Days	Oyster	Farmer 40	Mandore, Jodhpur
16	7-12-16 One Days	Oyster	Farmer 30	Village:- Salera, Bhinder, Udaipur
19	4.02.2017 One Days	Oyster	Entrepreneurs 20	3-J-25, Sec:-5, Udaipur
20	14-02-2017 One Days	Oyster	Farmer 30	B.N. University, Agri. Student, Udaipur
21	16-02-2017 One Days	Oyster	Farmer 40	Teh:- sapoha, karoli
22	27-02-2017 One day	Oyster	Farmer 10	V/P Barodiya, Vallabh nagar
23	8-03-2017 One day	Oyster	Farmer 20	Sec:- 9, Savina, Udaipur
24	21-03-2017 One day	Oyster	Farmer 25	184, Srinath nagar, Udaipur
25	30-03-2017 One day	Oyster	Farmer 30	Khamnor, Haldighati
			Total: - 535	

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 are preserved. Some exhibits showing all technical knowhow for the farmers. Apart from this a CD is also

prepared with complete production technology in steps with quality video graphy. Now this year we are going to prepare a complete CD having all the cultivation technologies of all cultivated edible and medicinal mushroom and by the end of December, 2017, it will be available for sale.

Supply of quality Mushroom Spawn: 1200 Kg



Training of Tribal Farmers under TSP at Udaipur



Tribal Farmers Growing Oyster and Button Mushroom



PD Dr. V.P. Sharma



CAZRI, Director and VC of RAU



ICAR Committee-Dr.G.Kallu and Dr.SR Maloo

VC, RAU and CAZRI, Director
Dr.O.PYadav

ICAR Co-Ordination Committee

ICAR Team with Dr.Kallu
and ADG, Education

Fig. 6.18. Extension activities and distinguished visitors at Udaipur Centre

Vellayani Centre

Table. 6.47. Trainings conducted

Sl No	Topic	Name of scientist	Category	Date	No of days	No of participants
1	Spawn production and mushroom cultivation	Dr. Lulu Das	Educated unemployed youth	22 nd to 23 rd July 2016	2	41
2	Spawn production and mushroom cultivation	Dr. Lulu Das	Educated unemployed youth	27 th to 28 th October 2016	2	29
3	Spawn production and mushroom cultivation	Dr. Lulu Das	Educated unemployed youth	24 th and 25 th January 2017	2	29
4	Spawn production and mushroom cultivation	Dr. Lulu Das	VHSE students	14 th February 2017	1	25

Dr. Shashi Tharoor, MP inaugurating
mushroom training hallBottle mushroom launching by
Dr. P. Rajendran, Vice Chancellor, KAUGovernor and Agril Minister visiting
mushroom stall at VAIGA, 2016

Mushroom day celebrations at the centre



Director, DMR visiting AICRP, Vellayani centre



Bed preparation by trainees

Fig. 6.19. Extension activities at Vellayani centre

A total of twelve training programmes were conducted at the Institute where farmers/beneficiaries were trained on mushroom cultivation technologies

Table. 6.48. Training programmes organized

Training	Date/duration	Beneficiaries	No. of participants
Improved production technologies	May 16-22, 2016	Farmers of HP	20
Improved production technologies for Kharif crops	May 24-27, 2016	Farmers of Dehradun, UK	36
Exposure cum Training	June 2-3, 2016	Farmers of Pithoragarh, UK	19
Hill Agriculture	July 25-29, 2016	Farmers of Munsiri	30
Improved production technologies for hill crops	Sept 5-7, 2016	Farmers of UK	33
Improved production technologies for Rabi crops	Sept. 15-17, 2016	Farmers of UK	27
Improved production technologies for hill crops	Nov. 17-19, 2016	Farmers of Pithoragarh, UK	25
Improved production technologies for hill crops	Nov. 21-23, 2016	Farmers of Pithoragarh, UK	32
Oyster mushroom production technology	March 17, 2016	Almora	13
Total			235

Farmer's fair:

Farmers (500 and 721) were exposed to oyster and button mushroom cultivation technology during farmers fair held on 24.09.2016 and 22.03.2017, respectively.

Mushroom Composting Unit

A mushroom composting unit having two pasteurization tunnels, each having 10 tons output capacity was constructed and operational.

Hisar Centre

Trainings on Mushroom Production Technology

No. of (3-days) trainings at main campus: 2

Training's conducted at KVK's (3-5 days): 15

21 days training successfully conducted at KVK Bhiwani from March 10-30, 2017: 1

Mushroom day organized on Nov. 30, 2016 at Jandli Khurd, Fatehabad and Dec. 23, 2016 at main campus: 2

Spawn supplied to the growers of Haryana, Punjab and Rajasthan in kg: 2281

Mushroom stalls on Dec. 23, 2016 and 1st Haryana conclave and Agri. Expo dated March 22-23, 2017: 2

Coimbatore Centre

Table. 6.49. Mushroom Training Programmes Organized

S.No.	One day training				Five day training				Spawn sold		Visitors to AICRP Mushroom Unit
	No.	No. of participants			No.	No. of participants			No. of bags	Qty. (kg)	
		M	F	Total		M	F	Total			
Apr. 16	1	60	09	69	-	-	-	-	268	67	134
May 16	1	67	14	81	-	-	-	-	237	66	127
Jun. 16	1	30	04	34	-	-	-	-	665	166	157
July 16	1	56	19	75	-	-	-	-	593	148	147
Aug. 16	1	68	10	78	1	13	04	17	450	112	156
Sep. 16	1	46	09	55	1	10	01	11	1858	465	211

Oct. 16	1	40	13	53	-	-	-	-	719	180	109
Nov. 16	1	34	08	42	1	10	04	14	634	159	99
Dec. 16	1	25	57	82	1	03	-	03	1881	470	110
Jan. 17	1	103	79	182	-	-	-	-	1395	348	91
Feb. 17	1	34	08	42	-	-	-	-	310	78	88
Mar. 17	1	59	12	71	-	-	-	-	540	135	92
TOTAL	12	642	222	864	4	33	12	45	9480	2394	1521

Table. 6.50. Special Training Classes to Self Help Groups / Farmer groups

S.No	Date	Name of the Organization	Staff	Trainees	Total
1.	11.04.2016	Towy Jhon, Asst. Director of Agriculture, Romni, Kerala	1	32	33
2.	03.01.2017	Agricultural Research Station, Achariya NG Ranga Agricultural University, Srikakulam, AP	1	27	28
3.	24.01.2017	Dhan foundation -,Building Institution for Genarations, Mudurai	3	30	33
4.	25.01.2017	Agri. Engineering Training Centre, Kottapattu, Trichy	1	25	26
5.	25.01.2017	Krishi Bhavan Cheekode, Dept. of Agricultural	1	20	21
6.	24.01.2017	AETC, AED, Trichy	3	21	24
7.	10.02.2017	KVK, Perambalur	1	13	14
8.	02.03.2017	Precision Farming Development Centre, AEC & RI, TNAU, Coimbatore	2	25	27

Out Reach Programme

- ❖ A National Seminar on “Enterprising Mushroom Biotechnology” sponsored by UGC-SAP-SAR 1 was organized on 16th March 2017. More than 350 participants from Tamil Nadu, Kerala, Karnataka, Maharashtra and Andhra Pradesh including students, researchers, scientists and entrepreneurs participated in the Seminar.

❖ National Mushroom Day celebration

Awards/Medals/Recognitions

- ❖ Dr.A.S.Krishnamoorthy - Invited speaker during 37th Annual Conference of Indian Society of Mycology and Plant Pathology held at BCKVV, Nadia, West Bengal between 23rd and 25th Nov.2016 and conferred with “Guest of Honour Award”
- ❖ Chief Editor, Madras Agricultural Journal (estd.1911.)

Radio Programme

“Money from Mushroom” – All India Radio, Coimbatore Broadcasted on 24.10.2016



National Mushroom Day Celebrations 23rd December 2016



Visit of Dr.V.P. Sharma, Director, DMR



UG Experiential learning Students

Delegates from
Carl Kuber Instt. GermanyNational Seminar on Enterprising Mushroom Biotechnology
(Dr. K Ramasamy, Vice Chancellor Lighting the lamp)

Fig. 6.20. Extension activities at TNAU, Coimbatore

Jammu Centre

National mushroom day at SKUAST-J

National Mushroom Day was celebrated in Mushroom Research and Training Centre at SKUAST-J, Main Campus, Chatha (Jammu). On this occasion students and staff of the University was made aware of the benefits of mushroom cultivation as well as consumption. Dr. Anil Gupta, Head Division of Plant Pathology and Dr. Sachin Gupta, PI, AICRP on mushrooms delivered expert lectures on year round cultivation of mushrooms and mushrooms for healthy living respectively. A mushroom awareness quiz was also organized on this occasion to test the level of awareness about mushrooms among the students. The participants pledged to create awareness among masses regarding benefits of mushroom cultivation and to include mushrooms at least twice a week in their diet.

Visit of dignitaries

The following dignitaries visited the Mushroom Research and Training Centre, SKUAST-J:

- Prof. Pradeep K Sharma, Hon'ble Vice Chancellor, SKUAST-J
- Prof. Sudheer Kumar Jain, Hon'ble Vice Chancellor, SMVDU, Katra
- Prof. S. L. Mehta, Ex-DDG ICAR
- Prof. J. P. Sharma, Director Research, SKUAST-J
- Prof. T.A.S Ganai, Director Education, SKUAST-J
- Prof. S.A. Mallick, Dean, Faculty of Basic Sciences, SKUAST-J

Visit of farmers to the newly established Mushroom Research and Training Centre, SKUAST-J

125 farmers hailing from Jammu, Udhampur, Samba, Kathua, Ramnagar, Doda, Rajouri, Reasi, Ramban, Kishtwar districts visited the Mushroom Research and Training Centre, SKUAST-J during the year 2016-17. The farmers were made aware of mushroom cultivation and spawn production. Mushroom growers of Jammu division are being regularly advised on remedy of problems encountered in mushroom cultivation.

Students trained on Mushroom Cultivation

Twelve undergraduate students of B.Sc. (Ag.) programme were imparted hands on training on various aspects of Mushroom Cultivation and Spawn production under the Experiential Learning Programme.

Training organized and expert lectures delivered

- Organized two days training programme on “Mushroom Cultivation, Preservation and Value Addition” for the officers of Department of Agriculture, Govt. of J & K on 22nd - 23rd Nov., 2016. The training was organized in collaboration with State Agricultural Management Extension Training Institutes (SAMETI). The participants were made aware of the recent trends in mushroom cultivation and spawn production.
- Delivered expert lecture on mushroom cultivation for entrepreneurship in the skill development programme for entrepreneurs organized by KVK Jammu, SKUAST-J on 20th January, 2017.
- Delivered expert lecture on tips on round the year mushroom cultivation of mushrooms for farmers of Ramban district organized by Farmer Training centre, Govt. of J& K on 28th January, 2017.
- Delivered expert lecture on mushroom cultivation during Induction training programme for VAEA'S organized by State Agricultural Management Extension Training Institute (SAMETI),

SKUAST-J on 2nd January, 2017.

- Delivered expert lecture on mushroom cultivation in one day awareness programme under at Chak Dulma and Chak Lala on 3rd January, 2017 organised by GKMS, SKUAST-J..
- Delivered expert lecture on economics of mushroom cultivation during exposure visit of KVK Farmer Club Members on improved vegetable and medicinal plants cultivation practices for better livelihood on 9th February, 2017.
- Delivered expert lecture on mushroom cultivation during Induction Training Programme for VAEA'S organized by State Agricultural Management Extension Training Institute (SAMETI), SKUAST-J on 7th March, 2017.

Trainings attended

- Attended training on Mushroom taxonomy held at DMR Solan w.e.f 9-06-2016 to 13-06-2016.
- Attended 21 days winter school on bioactive compounds from medicinal plants: A wealth of novelties and opportunities organized at DMAPR, Anand w.e.f 1-12-2016 to 21-12-2016.
- Attended three days workshop on imparting training on mushroom cultivation technology through digital content held at DMR, Solan w.e.f 22th-24th March, 2017.





Fig. 6.21. Extension activities at SKUAST, Jammu

Srinagar centre

- Two days training programmes sponsored by Directorate of Extension was conducted at Mushroom Research & Training Centre, Division of Plant Pathology on “*Spawn Production Technology*” on 16-17 Feb 2017 for 53 participants from district Anantnag and Srinagar. Lectures were delivered on disease constraints in mushroom spawn production besides giving practical demonstration to the participants.
- One day training program on mushroom production technology was conducted on 15th Feb 2017 in collaboration with department of Science and technology. Lectures were delivered on low cost technology for production of button and dhingri mushrooms besides giving practical demonstration to the participants.
- Participated as resource person and arranged mushroom exhibits and mushroom spawn during Exhibition cum Seed Mela organized on March 11-12, 2017 at University campus.
- National Mushroom Day was celebrated on 23rd December 2016 under AIRCP mushroom. 200 mushroom spawn bottles were provided free of cost to the participants.
- 3460 bottles of hybrid strains of white button mushroom (*Agaricus bisporus*) and 800 bottles of dhingri mushroom was supplied to progressive growers from KVK's and line department during autumn 2016.
- Field advisory visits were paid to mushroom growers of Kashmir division during composting, casing and cropping period of both spring and autumn crops for management of diseases.
- Regular advisory to mushroom growers is being provided on weekly basis on university web site.
- TV talks are being delivered on Doordarshan to make farmers aware about the cultivation technology and disease management.





Fig. 6.22. Extension activities at SKUAST, Srinagar

Jorhat centre**Table. 6.51.** Trainings conducted on Oyster Mushroom Cultivation

S.No.	Place	No. of Trainees	Date
1	Balijan Shyam Gaon, Titabar, Jorhat District.	21	09.12.16
2	Solia Gaon, Rowriah, Jorhat District (All women group)	33	30.12.16
3	College of Home Science, AAU, Jorhat (to SHG members, all women group)	15	15.03.17

Mizoram Centre**Table. 6.52.** Training Programme organised by ICAR RC NEH Region, Mizoram Centre 2016-2017

Sl. No	Training name	Days	Participant (M:F)
1	Commercial spawn production and cultivation technology of Mushroom	7	15 (12:3)
2	Integration of Mushroom cultivation in farming system for socio-economic improvement of <i>Chakma</i> tribes in Mizoram	5	20 (10:10)
3	Mushroompreneurship: a suitable enterprise for tribal youth and farm women of Mizoram	3	45 (30:15)
	Total	15	80(52:28)

Table. 6.53. Mushroom spawns production and supply (2016-2017)

Oyster mushroom spawn		Mother culture (test tube) nos	Fresh Mushroom sale (kg)
1556 bags (500g)	778 kg	15	89 kg





Training programme for Youth, farm men and women of Mizoram for strengthening



National Mushroom mela at Mizoram centre and Mushroom Products Display at District Level Horticulture Exhibition cum Fair

Fig. 6.23. Extension activities at Mizoram Centre

VPKAS, Almora Centre

Trainings imparted: A total of twelve training programmes were conducted at the Institute

where farmers/ beneficiaries were trained on mushroom cultivation technologies.

Table. 6.53. Training programmes organized by Almora centre

Training	Date/duration	Beneficiaries	No. of participants
Improved production technologies	May 16-22, 2016	Farmers of HP	20
Improved production technologies for <i>Kharif</i> crops	May 24-27, 2016	Farmers of Dehradun, UK	36
Exposure cum Training	June 2-3, 2016	Farmers of Pithoragarh, UK	19
Hill Agriculture	July 25-29, 2016	Farmers of Munsiari	30
Improved production technologies for hill crops	Sept 5-7, 2016	Farmers of UK	33
Improved production technologies for <i>Rabi</i> crops	Sept. 15-17, 2016	Farmers of UK	27

Improved production technologies for hill crops	Nov. 17-19, 2016	Farmers of Pithoragarh, UK	25
Improved production technologies for hill crops	Nov. 21-23, 2016	Farmers of Pithoragarh, UK	32
Oyster mushroom production technology	March 17, 2016	Almora	13
Total			235

Radio Talk

Delivered two radio talks on button mushroom utpadan and oyster mushroom utpadan at AIR, Almora.

Farmer's fair

Farmers (500 and 721) were exposed to oyster and button mushroom cultivation technology

during farmers fair held on 24.09.2016 and 22.03.2017, respectively.

Mushroom Composting Unit

A mushroom composting unit having two pasteurization tunnels, each having 10 tons output capacity was constructed and operational.



Fig 6.24. Compost pasteurization facility developed at VPKAS, Almora

Tripura Centre

Low cost mushroom house demonstration unit

Agriculture being the main occupation in Tripura, where rice is the major crop grown in 70% of the cultivable area there is a year round production of paddy in Aman, Aush and Boro season, assures a

abundant availability of the paddy straw, which is one of the suitable substrate for mushroom cultivation. The climatic conditions of Tripura are very much suitable for mushroom cultivation. The best period for oyster mushroom (*Pleurotus* spp) cultivation in Tripura is between October to March, with three crops in each season. Tripura is also

known for its abundant bamboo production, which can be taken as the raw material for building the low cost mushroom house. The small and the marginal framers along with their main occupation can integrate mushroom cultivation which gives a supplementary income to the framers and improve their livelihood. With an advantage of being less labor intensive it is highly suitable to the farmers and also to house wives, who can practice the mushroom cultivation along with the daily chores. To promote and encourage the farmers to take mushroom cultivation as one of the component of the Integrated Farming System, a low cost mushroom house (Rs 12,060/-) which can last for 4 years and affordable by the small and marginal farmers, was constructed at ICAR Research Complex for NEH Region, Tripura centre as a demonstration unit. The economics were worked out for the profitable venture, which gives additional financial support along with the nutritional benefit to the poor families. In addition, as the bamboo structure unit creates a cooler environment, favorable for the good yield of the mushroom. The house will be demonstrated to the farmers with the emphasis to integrate mushroom cultivation as one of the supplementary component in their Integrated Farming System to improve their livelihood, along with economic and nutritional security of their family.



Outside view of low cost mushroom

Economics of mushroom cultivation

The economics were calculated for six months (October to march) of the year in a low cost mushroom house (12x 10 x 7) which will last for 4 years that can accommodate 150 beds in each batch of 2 months duration. a total of three batches (150 x 3) can be taken in each season.

- A. Construction of low cost Mushroom bamboo house of size (12x 10 x 7) = Rs 12,060/4 = Rs 3015 (cost for one year)
- B. Cost of making 450 beds @ Rs 13 per bed = Rs 5850/-
- C. Labour charges as per standard charges for 180 hours for each season = 5895/-
- D. Income from mushroom production @ 0.35kg per bed sold at Rs 180 = Rs 28,350/-
- E. NET PROFIT = Gross income (C) - Total cost (A+B+C)
 = Rs. 28,350 - (Rs 3,015 + Rs 5,850 + Rs. 5,895)
 = Rs 28,350 - Rs. 14,760
 = Rs 13,590/-

A net profit of Rs 13,590/- can be obtained by maintaining 450 beds in one season which is an additional income to the farmers.



Inside view of low cost mushroom

Fig 6.25. Low cost mushroom huts developed at Tripura centre

The technology developed for the oyster mushroom in Tripura was promoted in different needy sections of the society by

organizing the training programme under AICRP Mushroom. The trainings were organized covering about 154 people.

Thereafter 5 spawn were given to each beneficiaries. The farmers were appraised about the cultivation of the mushroom, its economics and the scope to develop the entrepreneurship

Table. 6.53. Training programmes organized by Tripura centre

Sl.no	Date	Name of the villages	No. of farmers attended
1.	16-07-2016	Lembucherra	20
2.	12-01-2017	Damdamia	66
3.	15.02.2017	Hazamora	40
4.	25.03.2017	Shamburampara	28



Fig 6.26. Mushroom cultivation practical demonstration at different places in Tripura

7. PUBLICATIONS

Bhubaneswar Centre

Research Article

- Pani, B.K. 2016. Studies on tissue culture as a biotechnological tool for improving production of milky mushroom (*Calocybe indica*). *International Journal of Plant, Animal and Environmental Sciences*, **6** (4): 11-14.
- Pani, B.K., Chinara, N. and Mohapatra, K.B. 2017. Studies on effect on mother culture and successive sub cultures on the yield of straw mushroom, *Volvariella volvacea*. *International Journal of Plant, Animal and Environmental Sciences*, **7**(1): 37-40.

Popular articles

- Mohapatra, K.B. 2016. Mushroom Cultivation in Odisha: opportunities and challenges, *Ananygiri*, Special issue on Doubling Farm Income by 2022, pp. 55-58.
- Mohapatra, K.B., Pani, B.K. and Chinara, N. 2016. Role of mushroom cultivation in rural development. *Agrivision*. College of Agriculture, OUAT, Bhubaneswar, pp 52-54.

Research papers presented in International/ National Seminars/Symposia

1. Patra, S., Chinara, N. Naik, J and Mohapatra, K.B. 2016. Effect of substrate pasteurization methods on productivity

of straw mushroom, *Volvariella volvacea*. National symposium on “ New Horizons in Pest Management for Sustainable Development Goals, Society of plant Protection and Environment, 23-24 December, 2016, OUAT, Bhubaneswar pp 34-35.

2. Debata, D.K., Sethy, A.K. and Mohapatra, K.B. 2016. Management of Anthracnose Disease of Raikia Bean caused by *Colletotrichum lindemuthianum*. National symposium on “ New Horizons in Pest Management for Sustainable Development Goals, Society of plant Protection and Environment, 23-24 December, 2016, OUAT, Bhubaneswar pp 49-50.
3. Mohapatra, K.B. and Naik, J. 2016. Effect of Plant Extracts on Incidence of *Aspergillus niger* and Seed germination in Groundnut. National symposium on “ New Horizons in Pest Management for Sustainable Development Goals, Society of plant Protection and Environment, 23-24 December, 2016, OUAT, Bhubaneswar pp 207-208.

Chapters in Book

- Chinara, N., Mohapatra, K.B. and Pani, B.K. 2016. Mushroom: A functional food. (In:) Trailing the Foot Prints of Nutrition and Wellness: Entrapping Foothold of Healthy Nation, Anand Prakashan, Kolkata pp: 103-108.

S. No.	Particulars	Date	Venue
1	State Level Research Council Meeting	4.06.2016 -6.06.2016	OUAT, Bhubaneswar
2	State Level Extension Council Meeting	6.06.2016 -8.06.2016	OUAT, Bhubaneswar
3	XVIII Annual workshop of AICRP on Mushroom	9.06.2016 to 10.06.2016	ICAR -DMR, Solan
4	A training programme on “ Mushroom Taxonomy”	11.06 .2016 to 13.06.2016	ICAR -DMR, Solan

5	One day workshop on “ Doubling farm income by 2022”	30.06.2016	OUAT, Bhubaneswar
6	XXIII zonal workshop of KVK of zone VII	05.09.2016	CIFA, Bhubaneswar
7	National Symposium on “New Horizons in pest management for sustainable development goals”	23.12.2016 -24.12.2016	OUAT, Bhubaneswar
8	Consultative workshop on MIDH (NHM)	10.01.2017 to 11.01.2017	OUAT, Bhubaneswar
9	National Seminar on “ Pest free India-2017”	21.01.2017	OUAT, Bhubaneswar
10	One day workshop on “ Protected cultivation of Anthurium and Lilium”	14.03.2017	OUA, Bhubaneswar

Thesis

Patra, Sucheta.2016. Standardization of growing techniques of summer paddy straw mushroom, *Volvariella volvacea* in East and South Eastern coastal plain of Odisha. A thesis submitted to OUAT, Bhubaneswar for award of M.Sc (Ag) degree.

Pune Centre

Workshop/symposia/seminar attended

Sr. No.	Name of staff members	Workshop/symposia/ Seminar/Training	Venue	Date
1	Dr. D.B. Shinde Dr. A.C. Jadhav	XVIII Annual Workshop of AICRP on Mushroom	DMR, Chambaghat, Solan (HP)	9-10 June, 2016

5. Papers published:

Scientific publications				
Sr. No.	Name of authors	Title	Name of journal/Year/Volume	Page No.
1	Jadhav, A. C., Bhalerao, V.K. and Shinde, D.B.	Mushroom biodiversity of Maharashtra	Book Chapter in “Mushrooms in India” (Diversity, Improvement, Cultivation, Medicinal Uses and Value Addition), Edt: Satyawati Sharma, Manjit Singh, Shalini Prasad and Himanshi Rahtore. Centre for Rural Development & Technology, Indian Instt. of Technology, New Delhi.	38-61
Technical publications				
1	Bhalerao V.K., Jadhav A.C., D.B. Shinde and N.G. Desai	<i>Oyster mushroom lagwad</i>	Lokmangal Sheti Pratik : September, 2016	18-23
2	Jadhav A.C., Bhalerao V.K., D.B. Shinde and N.G. Desai	<i>Dhingri alimbi utpadan va vikri vyavasthapan</i>	Shetkari, November, 2016	41-44
3	Jadhav A.C., Bhalerao V.K., D.B. Shinde and N.G. Desai	<i>Dudhi mushroom lagwad Tantradnyan</i>	Lokmangal Sheti Pratik : November, 2016	14-17
4	Jadhav A.C., Bhalerao V.K., and N.G. Desai	<i>Quality Dhingari Mushroom Farm(Maharashtra): Safalta ki kahani</i>	Chhatrak (Hindi): 2016	65-67
5	Jadhav A.C., Bhalerao V.K., and N.G. Desai	<i>Siddharat Mushroom (Maharashtra): Safalta ki kahani</i>	Chhatrak (Hindi): 2016	68-71

Academic activities

In addition to mandatory research activities, the staff of mushroom project was also engaged in teaching activities.

Resource person	Courses taught
Dr. D. B. Shinde (Mycologist)	Under Graduate H-MIBO - 111 (1+1) AEL. ASDS-487 (0+1) Post Graduate MICRO-501 (3+1); MICRO-504 (2+1) MICRO-506 (2+1) *Two M. Sc. (Agri.) students for Post Graduate research work.
Prof. A.C. Jadhav (Jr. Mycologist)	Post Graduate MICRO - 502 (3+1) MICRO-505 (2+1) AEL. ASDS-487 (0+1) *Two M. Sc. (Agri.) students for Post Graduate research work

Raipur Centre

1. Technical bulletin and mushroom production folders on Oyster, *Volvariella* and *Calocybe*
2. Compendium of Lectures Mushroom Production and Processing Technology
3. Research Papers published: 1
4. Thesis: 3 M.Sc. and 1 Ph.D
5. Courses on Mushroom Production Technology Offered for UG, PG and PhD students
6. Advisory services on set up Oyster, *Volvariella* and *Calocybe* and button mushroom production units

Nauni Centre*Research papers*

1. Sharma Manju, Suman B.C. and Dharmesh Gupta. 2016 .Development of *Agaricus bisporus* hybrids and their evaluation for higher yield. Indian J. Hort. 73(4): 550-556

Book Chapters

1. Gupta Dharmesh, Praneet Chauhan and RS Jarial.2016. Microorganisms associated with spoilage of spawn. pp:

85-91. In: Mushrooms in India (Diversity,Improvement,Cultivation,Medicinal Uses and Value Addition for Rural Development) eds: Satyawati Sharma, Manjit Singh, Shalinee Prasad and Himanshi Rahore. Indian Institute of Technology, New Delhi.

Popular Articles

1. Gupta Dharmesh, Suman BC, Jarial RS, Sharma Manju and Pawan Sharma.2016. Aushdhiye Guno se Bharpur-Reishi Mushroom. *Chatrak* 11-12.

Participation in conference/workshop

1. Participated in Mushroom mela at DMR, Chambaghat, Solan on 10th Sep. 2016
2. Dr Dharmesh gupta participated in the XXVIII AICRP (Mushroom) workshop at DMR, Chambaghat on 9-10 June 2016.

M.Sc. Thesis: "Studies on microbial contaminants of spawn of *Agaricus bisporus* and their management" by Ms. Perna Bhargav (H-2014-58-M). Chairman: Dr Dharmesh Gupta

Pusa Centre*T.V. Talk*

- मशरूम उत्पादन समस्या एवं समाधान— दूरदर्शन मुजफ्फरपुर (दिनांक 22.09.2016)

- बटन मशरूम उत्पादन— ई.टी.भी., बिहार (दिनांक 15.10. 2016)
- समरमायिक मशरूम उत्पादन, ईटीबी बिहार 26.12.2016

Award/Recognition

- 1st Prize 2016- Mushroom Hub during किसान मेला –सह– भारतीय कृषि शिक्षा दिवस– 2016 (दिसम्बर, 03–05, 2016).
- जलवायु परिवर्तन अनुकूल मशरूम की खेती का विमोचन– किसान मेला –सह– भारतीय कृषि शिक्षा दिवस– 2016 के दौरान शिक्षाविद डॉ० रमेशचन्द्र श्रीवास्तव, कुलपति के द्वारा किया गया।
- President ISMPP, East Zone 2015
- Organized 37th Annual Conference and National Symposium, 2015 on “Food Security through Plant Health Protection” from April, 04-06, 2016.
- Vice-President of ISMPP, 2016.

Participation in Symposium/Seminar etc

- Participated in 38th Annual Conference and National Symposium on Challenges to words plant health under changing scenario for sustainable agricultural held at BCKVV, W.B. from November, 24-26, 2016.

Research Paper

- Dayaram and Mithlesh kumar (2016) Tricholoma giganteum massee. A new edible mushroom from bihar paper presented in ISMPP 37th Annual Conference and symp. on “Food Security through Plant health protection” held on April, 04-06, 2016 at DRPCA, Pusa (Bihar).

- Singh, S. Singh, SP and Dayaram (2016). Livelihood Security through Mushroom Production in Bihar. National Seminar on Financing and Sustain Rural Agribusiness Enterprises – A bottom of Pyramid Approach from 18th to 19th November, 2016 held at school of Agribusiness Management College of Agriculture Prof. Jai Shanker, Telangana State Agricultural University, Rajendra Nagar, Hyderabad – 500030, page- 127-131.

- Dayaram (2016) Evaluation of different methods of button Mushroom compost production for yield polenta abstract souvenir East Zone meet cum National Symposium, 2016 on Plant health management for Food Security and Sefty BCKV, Kalyani Nodia from, Dec. 08-09, 2016.

- Suman S. K., Kumar M., Sharma V.K. and Dayaram (2016) RAPD Markers Based Diversity Analysis of Calocybe Indica Isolates from Bihar. Paper presented in National Conference on “Management of microbial resources for food security under climate smart agriculture”. Held on December, 22-24, 2016 at Dept. of microbiology, Dr.RPCA, Pusa.

मशरूम बुकलेट :-

- दयाराम, (2016)– जलवायु परिवर्तन अनुकूल मशरूम की खेती :- डॉ० राजेन्द्र प्रसाद केन्द्रीय कृषि विश्वविद्यालय, पूसा (प्रकाशन, पेज-8) Bulletin.
- दयाराम (2016)– “मशरूम के रोग” में फसल रोग प्रबंधन :- डॉ० राजेन्द्र प्रसाद केन्द्रीय कृषि विश्वविद्यालय, पूसा (प्रकाशन, पेज- 50–51)

Newspaper Clips

S. No.	Name of Title	Name of	Vol., Year, Page
1	सशक्त बने मशरूम के मार्केटिंग की व्यवस्था	हिन्दुस्तान	31 मार्च, 2017 (पेज-08)
2	आर्थिक कमी और कुपोषण को दूर करने की दिशा में बेहतर विकल्प है मशरूम : कुलपति।	दैनिक भास्कर	30 मार्च, 2017 (पेज-03)
3	भूमिहीन किसानों के लिए मशरूम उत्पादन बेहतर विकल्प।	प्रभात खबर	30 मार्च, 2017 (पेज-02)
4	भूमिहीन किसानों के लिए भी मशरूम उत्पादन बेहतर :कुलपति	दैनिक जागरण	30 मार्च, 2017 (पेज-05)
5	समाजिक व आर्थिक समृद्धि के लिए मशरूम महत्वपूर्ण : वीसी।	राष्ट्रीय सहारा	30 मार्च, 2017 (पेज-03)

6	मशरूम का व्यवसाय लाभकारी।	प्रभात खबर	24 मार्च, 2017 (पेज- 08)
7	बिहार में मशरूम की खेती तेजी से बढ़ रही : वाष्णीय।	दैनिक जागरण	24 मार्च, 2017 (पेज- 07)
8	आर्थिक सुरक्षा को मशरूम उत्पादन आवश्यक।	दैनिक भास्कर	24 मार्च, 2017 (पेज-)
9	हृदय रोग से बचोगा मशरूम।	हिन्दुस्तान	24 मार्च, 2017 (पेज- 04)
10	मशरूम की खेती दो माह में देती है दोगुना मुनाफा।		22 मार्च, 2017 (पेज- 07)
11	पौष्टिक व औषधीय गुणों का भण्डार है मशरूम : दयाराम	आज	20 मार्च, 2017 (पेज- 07)
12	मशरूम की खेती से होगी अच्छी आय।	प्रभात खबर	20 मार्च, 2017 (पेज- 07)
13	मशरूम की खेती से सालाना चार लाख की आमदनी।	प्रभात खबर	20 मार्च, 2017 (पेज- 04)
14	मशरूम उत्पादन का दिया प्रशिक्षण।	हिन्दुस्तान	20 फरवरी, 2017 (पेज- 07)
15	गुणों से भरा है मशरूम।	प्रभात खबर	20 फरवरी, 2017 (पेज- 04)
16	छात्र सीख रहे हैं मशरूम उत्पादन के गुर।	दैनिक जागरण	14 फरवरी, 2017 (पेज- 05)
17	मशरूम उत्पादन स्वरोजगार के रूप में सृजित।	प्रभात खबर	14 फरवरी, 2017 (पेज- 07)
18	मशरूम उत्पादन से दूर होगा कुपोषण।	हिन्दुस्तान	14 फरवरी, 2017 (पेज- 08)
19	मशरूम उत्पादन से आई आर्थिक समृद्धि	प्रभात खबर	06 फरवरी, 2017 (पेज- 04)
20	मशरूम की वागवानी से मिशाल बने रमाशंकर	प्रभात खबर	06 फरवरी, 2017 (पेज- 04)
21	स्नातक की पढ़ाई पूराकर रविरंजन कर रहे हैं मशरूम उत्पादन।	प्रभात खबर	06 फरवरी, 2017
22	मशरूम उत्पादन को बढ़ावा देने की जरूरत।	हिन्दुस्तान	01 फरवरी, 2017 (पेज- 07)
23	व्यवसाय व पौष्टिकता को मशरूम बेहतर।	दैनिक जागरण	फरवरी, 2017 (पेज- 07)
24	कुपोषण को दूर करने का बेहतर विकल्प है "मशरूम"।	दैनिक भास्कर	फरवरी, 2017
25	आदिवासियों के पिछड़ेपन की मुख्य वजह अशिक्षा।	प्रभात खबर	31 जनवरी, 2017 (पेज- 07)
26	मशरूम उत्पादन किसानों के लिये वरदान : डा० सिंह।	दैनिक भास्कर	25 जनवरी, 2017 (पेज- 03)
27	समृद्धि के लिये मशरूम को बनाये रोजगार।	हिन्दुस्तान	25 जनवरी, 2017 (पेज- 04)
28	राज्य के 12 गाँवों को गोद लेगा वि०वि०	हिन्दुस्तान	25 जनवरी, 2017 (पेज- 07)
29	समेकित कृषि से सुधारे माली हालात।	दैनिक जागरण	23 जनवरी, 2017 (पेज- 08)
30	समेकित कृषि को बढ़ावा दे किसान : डा० अशोक।	दैनिक भास्कर	23 जनवरी, 2017 (पेज- 07)
31	कृषि मामले में आत्मनिर्भर हुआ है बिहार।	प्रभात खबर	23 जनवरी, 2017 (पेज- 07)
32	मशरूम की खेती काफ़ी फायदेमन्द।	हिन्दुस्तान	16 जनवरी, 2017 (पेज- 03)
33	मशरूम की खेती से सालाना लाखों की कमाई।	प्रभात खबर	16 जनवरी, 2017 (पेज- 08)
34	मशरूम से लाखों की हो सकती है आमदनी।	दैनिक जागरण	16 जनवरी, 2017 (पेज- 05)
35	मशरूम की खेती से महिलाओं का विकास।	प्रातः कृषक	05 जनवरी, 2017 (पेज- 01)
36	जेल में मशरूम के साथ सब्जी की खेती कर रहे बन्दी।	प्रभात खबर	27 दिसम्बर, 2016 (पेज- 05)
37	पोषण व स्वास्थ्य के लिए मशरूम सर्वोत्तम।	दैनिक जागरण	24 दिसम्बर, 2016 (पेज- 04)
38	मार्केट की डिमांड के अनुरूप करें मशरूम का मूल्य संवर्दन : उपाध्याय।	हिन्दुस्तान	24 दिसम्बर, 2016 (पेज- 04)
39	मशरूम पौष्टिक व प्रोटीनयुक्त सब्जी : डॉ. उषा।	प्रभात खबर	24 दिसम्बर, 2016 (पेज- 08)
40	Jail Inmates effect to Mushroom outside.	The Telegraph	21 st Dec., 2016 (Page- 11)
41	आई.सी.ए.आर. टीम के द्वारा बेसिक साईंस का किया गया निरीक्षण।	हिन्दुस्तान	17 दिसम्बर, 2016 (पेज- 04)
42	गाँव व गरीबों के विकास में योगदान करेगा विश्वविद्यालय।	हिन्दुस्तान	04 दिसम्बर, 2016 (पेज- 04)
43	मशरूम से काटी कोठिया गाँव की पहचान।	दैनिक जागरण	13 दिसम्बर, 2016 (पेज- 08)
44	कैदियों ने सीखे मशरूम उत्पादन के गुर।	हिन्दुस्तान	13 दिसम्बर, 2016 (पेज- 06)
45	उत्पादकता बढ़ाकर आमदनी दुगुना करें।	प्रभात खबर	20 नवम्बर, 2016 (पेज- 05)
46	विश्वविद्यालय उपलब्ध करायेगा खाद बीज (वटन मशरूम की गुणवत्ता के लिये सरकारी स्तर पर पहली बार हुई व्यवस्था)	हिन्दुस्तान	10 नवम्बर, 2016 (पेज- 08)
47	प्रशिक्षण का काम जमीनी स्तर पर मिले	प्रभात खबर	06 नवम्बर, 2016 (पेज- 02)
48	ब्राण्ड अम्बेस्डर के रूप में कार्य करें।	हिन्दुस्तान	नवम्बर, 2016 (पेज- 06)
49	छात्रों में मशरूम उत्पादन प्रशिक्षण को लेकर जुनून।	दैनिक भास्कर	06 नवम्बर, 2016 (पेज- 06)
50	छात्रों में मशरूम उत्पादन प्रशिक्षण को लेकर जुनून।	प्रभात खबर	04 नवम्बर, 2016 (पेज- 04)
51	दाल एवं सब्जी का बेहतर विकल्प है मशरूम	हिन्दुस्तान	04 नवम्बर, 2016 (पेज- 04)
52	छात्रों का तीन दिवसीय प्रशिक्षण।	दैनिक जागरण	01 नवम्बर, 2016 (पेज- 04)
53	मशरूम की खेती का दिया प्रशिक्षण।	हिन्दुस्तान	25 अक्टूबर, 2016 (पेज- 03)
54	मण्डल कारा में मशरूम प्रशिक्षण।		25 अक्टूबर, 2016 (पेज- 09)
55	विश्वविद्यालय पहुँचे एन.सी.सी. कैडेट।	हिन्दुस्तान	22 अक्टूबर, 2016 (पेज- 08)
56	Mushrooms to Fight Hooch.	The Telegraph	13 th Oct, 2016 (Page- 11 Metro)
57	विदेशों से हो रही है मशरूम की मांग।	प्रभात खबर	13 सितम्बर, 2016 (पेज- 06)
58	स्वरोजगार का बेहतर विकल्प है मशरूम।	हिन्दुस्तान	30 सितम्बर, 2016 (पेज- 04)

59	नेपाल किसान की मशरूम की खेती ले रहे है।	हिन्दुस्तान	15 सितम्बर, 2016 (पेज- 04)
60	अदिवासियों को मशरूम से मिलेगा रोजगार।	हिन्दुस्तान	01 सितम्बर, 2016 (पेज- 04)
61	41 महिला किसानों ने सीखे मशरूम उत्पादन के गुर।	दैनिक भास्कर	01 सितम्बर, 2016 (पेज- 03)
62	आदिवासी महिलाओं को 31 दिनी मशरूम उत्पादन प्रशिक्षण।	प्रभात खबर	01 सितम्बर, 2016 (पेज- 05)
63	मशरूम के उपयोग का बढ़ेगा दायरा।	दैनिक जागरण	30 अगस्त, 2016 (पेज- 04)
64	मशरूम उत्पादन को बनाये चेन।	हिन्दुस्तान	30 अगस्त, 2016 (पेज- 04)
65	मिशन बोर्ड के अनुरूप मशरूम उत्पादन पर कार्य प्रारम्भ।	प्रभात खबर	30 अगस्त, 2016 (पेज- 08)
66	महिलाओं की सहभागिता से होगा हरित क्रान्ति का आगाज।	प्रभात खबर	29 अगस्त, 2016 (पेज- 05)
67	समृद्धि में मशरूम वेहतर विकल्प : डीन।	हिन्दुस्तान	29 अगस्त, 2016 (पेज- 04)
68	मशरूम उत्पादन सह किसान गोष्ठी का आयोजन।	आज	29 अगस्त, 2016 (पेज- 05)
69	मशरूम उगाकर 2 से 3 लाख तक की कमाई।	दैनिक भास्कर	29 अगस्त, 2016 (पेज- 05)
70	उत्पादन बढ़ाकर जिले को बनाये मशरूम हब: वी.सी।	दैनिक भास्कर	23 अगस्त, 2016 (पेज- 05)
71	मशरूम के क्षेत्र में महिलाएँ बने प्रेरणास्त्रोत : वी.सी।	हिन्दुस्तान	23 अगस्त, 2016 (पेज- 08)
72	महिला कैदियों ने सीखा मशरूम उत्पादन।	हिन्दुस्तान	03 अगस्त, 2016 (पेज- 04)
73	मशरूम उत्पादन सीख कैदी बनायेंगे रोजगार का साधन।	हिन्दुस्तान	01 जुलाई, 2016 (पेज- 07)
74	मशरूम से माह के अन्त में ही आमदनी।	दैनिक जागरण	22 जुलाई, 2016 (पेज- 07)
75	दाल का बेहतर विकल्प हो सकता है मशरूम : डीन।	हिन्दुस्तान	22 जुलाई, 2016 (पेज- 05)
76	मशरूम के क्षेत्र में व्यवसाय का नया आयाम।	प्रभात खबर	22 जुलाई, 2016 (पेज- 04)
77	मशरूम से दूर होता है कुपोषण।	हिन्दुस्तान	16 जुलाई, 2016 (पेज- 09)
78	मशरूम उत्पादन पर सात दिवसीय प्रशिक्षण।	आज	16 जुलाई, 2016 (पेज- 04)
79	मशरूम उत्पादन एक वेहतर विकल्प : मिथिलेश।	दैनिक भास्कर	16 जुलाई, 2016 (पेज- 03)
80	25 हजार मशरूम की खेती से जुड़े।	दैनिक जागरण	16 जुलाई, 2016 (पेज- 07)
81	दाल की क्षतिपूर्ति कर रहा है दूधिया मशरूम।	प्रभात खबर	26 जून, 2016 (पेज- 08)
82	हिमाचल में सम्मानित की गई लालगंज की बहू।	दैनिक जागरण	16 जून, 2016 (पेज- 06)
83	मशरूम उत्पादन में मनोरमा सिंह सम्मानित।	हिन्दुस्तान	16 जून, 2016 (पेज- 04)
84	मशरूम की खेती काफी लाभदायक : डॉ० दयाराम।	हिन्दुस्तान	31 मई, 2016 (पेज- 07)
85	राज्य के 4 गावों को गोद लूंगा- आर.ए.यू।	हिन्दुस्तान	31 मई, 2016 (पेज- 08)
86	कुलपति से मिले सम्मानित किसान।	दैनिक जागरण।	30 अप्रैल, 2016 (पेज- 03)
87	राष्ट्रीय स्तर पर मशरूम उत्पादन हुए सम्मानित।	हिन्दुस्तान	30 अप्रैल, 2016 (पेज- 04)

Udaipur Centre

Technical Bulletin

1. Dr. S.S.Sharma, Kala Nath, Avinash Kumar Nagda. 2017. Vibhinna Mushroom Utpadan ki Unnat Vidhiyan. 2017. Published by AICRP-Mushroom in Revolving Fund Project and are being sold at nominal prices to motivate the farmers. Pp1-73

Thesis

1. Vinita Dahima Ph.D 2016 "Investigation on indigenous edible mushroom *Pleurotus pulmonarius* and its antimicrobial activities in comparison with *pleurotus florida* and *Schizophyllum commune*" In Progress.
2. Mahendra Singh Meena Ph.D 2016 "Bioremediation of Heavy Metals

through *Lentinus squarrosulus* (Mont.) Singer and *Pleurotus pulmonarius* (Fr.) Quel. Champ." In Progress.

3. Dilbag Saran M.Sc 2016 "Investigations on Factors affecting growth and cultivation of Mushroom *Lentinus squarrosulus* Mont (Singer)" In Progress.

Vellayani Centre

Abstracts

1. Dr. Deepa Rani C.V and Dr. Lulu Das. 2016. "Studies on diversification of *Lentinula edodes* from *Lentinus* related genera". Abstract in National symposium on challenges to plant pathologists under changing disease scenario held at Goa from 5th to 7th October 2016. p 106.

2. Dr. Deepa Rani C. V and Dr. Lulu Das .2016. "Japanese Oak mushroom/ Shiitake (*Lentinula edodes*) for urban cultivation in Kerala". In proceedings of Kerala environment congress held at Trivandrum from 28th to 29th November 2016. p 130.
3. Dr. Lulu Das.2016. "Popularisation and promotion of value addition in mushrooms". Invited paper presented at VAIGA 2016 held at Trivandrum from 1st to 5th December 2016.
4. Dr. Deepa Rani C. V, Dr. Lulu Das and Dr. Susha S. Thara. 2016. Nutritive requirements for the vegetative growth of

Shiitake mushroom (*Lentinula edodes*) (Berk.) Pegler and its yield impacts on various agrowastes. In abstracts of Interantional seminar on emerging trends in organic farming and sustainable agriculture held at MG University, Kottayam from 29th to 31st December 2016. p79.

Popular Articles

1. Dr. Deepa Rani C. V and Dr. Lulu Das. 2016. "Shiitake- A medicinal mushroom". In Kerala Calling. pp46-47.
2. Meenu Maheshwaran and Dr. Lulu Das.2017. "Chevikoon kazhikoo rogangaal akattoo". In Karshakan. p 84.

Conferences/ seminar/ Workshops attended

Name and Designation	Name of seminar/ conference/ exhibition	National/ International	Venue	Date
Dr. Lulu Das Professor and PI	Lead paper in VAIGA 2016 (Value addition for income generation in agriculture) conducted by State Government and Agriculture Department	International	Kanakakunnu Palace, Trivandrum	1 st to 5 th December 2016
Dr. Lulu Das Professor and PI	Exhibition of mushroom conducted by State Social Welfare Department	National	Central Stadium, Trivandrum	9 th and 10 th February 2017
Dr. Lulu Das Professor and PI	Exhibition of mushroom in VIVIDHA 2017 conducted by Kerala State Biodiversity Board	National	Tagore Theatre, Trivandrum	22 nd and 23 rd February 2017

Other activities

1. Mushroom training hall with seating capacity of 50 was constructed with funds from ICAR. Dr. Shashi Tharoor, MP inaugurated the training hall on 29th September 2016.
2. "Cultivation of mushrooms in bottles- an innovative technology" developed by AICRP centre was launched by Dr. P. Rajendran, Vice Chancellor, Kerala

Agricultural University on 28th November 2016.

3. Mushroom day celebrations were conducted on 23rd December 2016. A recipe contest was arranged and 15 participants displayed their mushroom products. Prizes were given to 1st, 2nd and 3rd position winners.
4. A recipe contest was conducted on March 1st, 2017 by Kuthuvilakku

products of India. PI participated and won the second prize.

Visitors

Dr. V.P Sharma, Director and Project Co-ordinator of Directorate of Mushroom Research, Solan visited the centre on 15th march 2017 to evaluate the activities of the centre. He also visited Surya Agrotek, the farm of Sri. Ajay Kumar a progressive mushroom farmer of Kerala.

Almora Centre

Research Paper

1. Mishra K. K., Pal R. S., Mishra, P.K. and J.C. Bhatt (2016).Antioxidant activities and mineral composition of oyster mushroom (*Pleurotussajor-caju*) as influenced by different drying methods.*Asian J. Chemistry*. 28 (9): 2025-2030.

Radio Talk

1. Delivered two radio talks on button mushroom utpadan and oyster mushroom utpadan at AIR, Almora.

Farmer's fair:

1. Farmers (500 and 721) were exposed to oyster and button mushroom cultivation technology during farmers fair held on 24.09.2016 and 22.03.2017, respectively.

Coimbatore Centre

Out Reach Programme

- v A National Seminar on “Enterprising Mushroom Biotechnology” sponsored by UGC-SAP-SAR 1 was organized on 16th March 2017. More than 350 participants from Tamil Nadu, Kerala, Karnataka, Maharashtra and Andra Pradesh including students, researchers, scientists and entrepreneurs participated in the Seminar.
- v National Mushroom Day celebration

Awards/Medals/Recognitions

Dr. A. S. Krishnamoorthy - Invited speaker during 37th Annual Conference of Indian Society of Mycology and Plant Pathology held at BCKVV, Nadia, West Bengal between 23rd and 25th Nov.2016 and conferred with “Guest of Honour Award”

- ❖ Chief Editor, Madras Agricultural Journal (estd.1911.)

Radio Programme

“Money from Mushroom” - All India Radio, Coimbatore Broadcasted on 24.10.2016

Publications

1. Kirankumar, N., A. S. Krishnamoorthy, A.Kamalakkannan and D. Amirtham. 2016. Influence of temperature and pH on mycelial growth and chlamydospore production of paddy straw mushroom, *Volvariella volvaceae* (Bull. Ex Fr.) Sing. *J.Res. ANGRAU* .44(1&2) 1-7.
2. Kiran Kumar Nannapaneni, Krishnamoorthy Akkanna Subbiah, Kamalakannan Ayyanar, Amirtham Damodarasamy. 2016. Tyrosinase inhibitory potential of phytochemicals and mycomolecules. *International Journal of Green Pharmacy*. 10 (4): 1-7.
3. Krishnamoorthy, A.S. and B.Priyadharshini. 2016. Physical, Chemical and Biological Properties of Casing Soil Used for Milky Mushroom (*Calocybe indica* P&C) Production. *Madras Agric.J.* (in press)

Guest Lectures in Conferences

- ❖ “Mushroom Biomass Derived Pharma Products”- The present and future - 5th International Conference on Sustainable Utilization of Plant Biomass, Nov.17-18, 2016 organized by TNAU at Radission Blue, Coimbatore
- ❖ “Mushroom Biotechnology in Human Welfare” - Challenges and

Opportunities” in the National Seminar on Biotechnology, organized by Karunya University, Coimbatore on 18th Oct.2016

- ❖ “Mushroom Pharma Products” – Biotechnology Colloquium, organized by GRD Institute, Coimbatore during Jan.2017.

Teaching and Student Research Projects

- ❖ One ODL Course on Mushroom Cultivation was conducted from 31.01.2017 to 27.06.2017 through the Directorate of Open Distance Learning, TNAU, Coimbatore. A total number of 25 students have registered for the course.
- ❖ UG – IV year BSc.,(Agri.) / B.Tech. (Hort.) students - PAT 451 . Experiential Learning Course in Mushroom Production Technology (0+5) - 30 UG students have registered for the course.
- ❖ Handled PAT.601. Advanced Mycology (2+1) t Course to Ph.D students
- ❖ Guided 3 MSc.(Agri.) and 4 Ph.D Students for their Thesis project in mushrooms

Jammu Centre

Trainings attended

- Attended training on Mushroom taxonomy held at DMR Solan w.e.f 9-06-2016 to 13-06-2016.
- Attended 21 days winter school on bioactive compounds from medicinal plants: A wealth of novelties and opportunities organized at DMAPR, Anand w.e.f 1-12-2016 to 21-12-2016.

Ludhiana Centre

Seminar/Workshop

09-10.06.16	XVIIIth Annual Workshop of AICRP on mushrooms at DMR, Solan
21-22.12.16	Research and extension specialist workshop on fruits, mushroom, agroforestry alongwith post harvest management, FPM, FT and Agril economics, PAU, Ludhiana

- Attended three days workshop on imparting training on mushroom cultivation technology through digital content held at DMR, Solan w.e.f 22th-24th March, 2017.

Publications

- Gupta, S., Kumar, S., Gupta, M. and Mantoo, A. 2017. Evaluation of different grains and supplements for production of quality spawn of different mushrooms. *Indian Phytopathology* (Accepted).
- Gupta, S., Wali, A., Gupta, M. and Anneppu, S.K. 2017. Fungi: An effective tool for bioremediation. In "*Microbial Interactions and Agro Ecological Impacts Vol. 2 of Plant Microbe Interactions in Agro Ecological perspectives*." (Ed. Singh, D.P) Springer publishers. (In Press).
- Gupta, S., Summuna, B., Anneppu, S.K. and Gupta, A. 2017. Mushroom Diseases and Disorders: Diagnosis and Management. In "*Diseases of crops: Diagnosis and Management*" (Ed. Srivastava, J.N. and Singh, A.K.) CRC Press, USA. (In press)
- Gupta, S., Kumar, D. and Gupta, A. 2016. Compendium of lectures for the training programme on “Mushroom cultivation, Preservation and Value addition” held on 22-23rd Nov., 2016 organized by Div. of Plant Pathology, SKUAST-J, Jammu. 75 pp.
- Bharti, V. and Gupta, S. 2016. Casing awaran mein purkoon ka prayog. *Chatrak*. 1:13.

TV/Radio Talk/News Column	
06.09.16	Khumban di kasht, AIR, Jalandhar
08.09.16	Khumban di kasht, DDK, Jalandhar
18.09.16	Gharelu padhar te khumban di kasht, DDK, Jalandhar

Research papers

- Goyal A, Kalia A and Sodhi HS (2016) High - performance liquid chromatography studies to estimate ergosterol content of different developmental stages of the lingzhi or reishi medicinal mushroom, *Ganoderma lucidum* (Agaricomycetes). *Int'l J Medicinal Mushroom* 18(2): 1115-1120. (NAAS7.12)
- Kaur A and Sodhi HS (2016) Lignocellulolytic enzyme profile of *Pleurotus florida* (Mont.) Singer on wheat and paddy straw. *Indian J Ecology* 43(2): 388-391. (NAAS4.12)

Book chapter

- Sodhi HS and Jaswal RK (2016) Genetics of oyster mushroom, *Pleurotus* species for strain improvement. In "Mushrooms in India - Diversity, improvement, cultivation, medicinal uses and value addition for rural development" (Eds. S Sharma, Singh M, Parsad S and Rathore H.) Indian Institute of Technology, Delhi pp 62-84.

Meerut Centre

Book

Mushroom Utpadan Path Pradarshak (2017), Mushroom lab SVPUA&T, Meerut, pg- 60

Leaflet

Mushroom Utpadan Takneek (2016), SVPUA&T, Meerut, pg-02.

Nagaland Centre

Folder

- Rajesha G, Bendangsenla, Ph. Romen Sharma, E. Lireni Kikon, Mhalo Tungoe and D. J. Rajkhowa. 2017. Oyster

mushroom cultivation. ICAR Research Complex for NEH Region, Nagaland Centre, Medziphema, Dimapur, Nagaland.

Palampur Centre

Research papers

- Dhancholia, S. Naya Sharma, Pooja Kapoor, Abhishek Katoch, Prem Nath Sharma and S. Dhancholia (2016). Molecular characterisation and optimization of parameters for cultivation of *Pleurotus himalayaensis* Dhancholia. *Indian Phytopath.* 69(1).
- Sapan Kumar Sharma, Nandini Gautam, Narender Singh Atri, & Subhash Dhancholia. (2016) Taxonomical establishment and compositional studies of a new *Cordyceps* species from Northwest Himalayas. *Int. J. Med Mushrooms.* (Accepted).

Pantnagar Centre

Research paper

- Gajendra S Jeena, H Punatha, Om Prakash, Mahesh Chandra, KPS Kushwaha (2016). Study on in vitro antioxidant potential of some cultivated *Pleurotus* species (Oyster mushroom). *Indian Journal of Natural Products and Resources.* 5(1):56-61.
- KPS Kushwaha, Arun Kushwaha and SK Mishra (2016). Yield Evaluation of *Macrocybe gigantea* (Massee) Pegler & Lodge (Giant Mushroom) on locally available different agro-wastes. *Advances in Life Sciences.* 5(24): 11277-11278
- SK Mishra, Sanjeev Ravi and KPS Kushwaha (2016). Post-composting

supplementation of wheat bran and dal powder at spawning of *Agricus bisporus*. *Advances in Life Sciences* 5(17), 6887-6888.

4. Tanvi Gaur, PB Rao, and KPS Kushwaha (2016). Nutritional and anti-nutritional components of some selected edible mushroom species. *Indian Journal of Natural Products and Resources*. 7(2): 155-161.

Popular articles

1. Kushwaha, KPS (2016). Mushroom cultivation: an agribusiness. *Indian Farmers Digest* 50 (10). 24-29.

Pasighat Centre

Bulletin

- Shakywar, R C, P Raja, N Surmina Devi and Riba Toge (2016). "*Cultivation, Spawn Production and Processing of Oyster Mushroom*" Published from Department of Plant Protection, CHF, CAU, Pasighat during ten days training programme 17-26 August 2016: pp1-58.

Sikkim Centre

Research paper

- Gopi, R., R.K. Avasthe, Ashish Yadav, H. Kalita, C. Poudyal and S.V. Ngachan.

2016. High Yielding Local Oyster-Mushroom (*Kannaecheae*). *ICAR News*, (Oct.-Dec.2016). Vol.22, No.4: p11-12.

Folder

- Gopi,R., Ashish Yadav, R.K. Avasthe,N.J. Singh, H. Kalita and M. Singh. 2017. Organic Oyster Mushroom Cultivation Technology. SKM/EF/2017/17.

Kalyani Centre

Teaching and Outreach Programme

- ❖ UG – IV year BSc. (Agri.) students were taught PPI 451. Experiential Learning in Mushroom Production Technology 0+2 Course during VIII Semester 2014-15(RAWE program)
- ❖ PG – One MSc. (Ag.) Plant Pathology student has been allotted work on *Pleurotus* mushroom.

Participation in the National / International Conferences

- Participated in National Plant Pathology Conference, IPS held at ICAR, NEH-Region, Umiam, Shillong Meghalaya 09-11 Jan., 2017

8. PERSONNELIA

Staff position at various AICMIP Centres during 2016-17

Sl.No	AICRP Centre	Name of staff	Designation
A. ICAR Institute based Coordinating Centre			
1.	ICAR Research Complex for NEH Region, Umiam 793 103, Meghalaya	Dr. Pankaj Baiswar	Sr. Scientist, Plant Pathology
2.	ICAR – National Organic Farming Research Institute, Sikkim, Tadong, Gangtok-737102 (Sikkim)	Dr. AshishYadav	Sr. Scientist (Horticulture)
3.	ICAR Research Complex for NEH Region, Arunachal Pradesh Centre, Basar-791101, Arunachal Pradesh	Dr. Raghuveer Singh	Scientist, Plant Pathology
4.	ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani, Medziphema - 797 106, Nagaland	Dr. Rajesha G	Scientist (Plant Pathology)
5.	ICAR Research Complex For NEH Region, Mizoram Centre, Kolasib 796 081, Mizoram	Dr. Ratan Kumar Singh	Scientist (Plant Pathology)
6.	ICAR Research Complex for NEH, Region. Manipur Centre, Lamphelpat, Imphal - 795 004	Dr. Hemavati Ranebennur	Scientist (Plant Pathology)
7.	ICAR Research Complex for NEH, Tripura Centre, Lembucherra, Tripura West, Pin-799210	Dr. Susheel Kumar	Scientist (Plant Pathology)
8.	ICAR Research Complex for Eastern Region, Research Centre, Plandu, Ranchi 834010 (Jharkhand)	Dr. Sudarshan Maurya	Sr. Scientist, Plant Path
9.	ICAR-Central Island Agri. Res. Institute, Port Blair (Andaman & Nicobar Island)	Dr. K. Sakthivel	Scientist (Plant Pathology)
10.	ICAR-Indian Institute of Horticultural Research, Bangalore	Dr. Meera Pandey Dr. Chandrashekara C	Pri. Scientist (Pl Path) Scientist (Pl Path)
B. SAU based Coordinating Centre			
1	Dept. of Plant Pathology, Centre for Plant Protection studies, Tamil Nadu Agricultural University, Coimbatore - 641 003	Dr AS Krishnamoorthy	Professor
		Th.N. Ramamoorthy	Laboratory Assistant
		Tmt. V. Kalpana	Jr. Assistant
		Th.Venkatesan	Lab.Tecnician
		Th. P.Selvaraj	Skilled mazdoor
2.	Centre for Tropical Mushroom Research and Training, Dept. of Plant Pathology, Orissa Agricultural University,	Dr. K.B. Mohapatra	Associate Professor
		Sh. N. Chinara	Asst. Professor

	Bhubaneswar, Orissa		
3.	Dept. of Plant Pathology, College of Agriculture, CCS Haryana Agricultural Univ., Hisar - 124 005	Dr. Surjit Singh	Professor
4.	Department of Microbiology, College of Basic Sciences and Humanities, Punjab Agricultural University, Ludhiana - 144 001.	Dr. H. S. Sodhi	Sr. Mycologist
		Dr. Shivani Sharma	Asstt. Mycologist
		Mr. Raj Kumar	Sr Laboratory Assist.
		Mr. Vipin Barot	Fieldman
		Mr. Gurpreet Singh	Typist-cum-Clerk
		Ms. Shinder Kaur	Beldar
5.	Mushroom Research and Training Centre, G.B. Pant University of Agri. & Tech., Pantnagar - 263 145 (Uttarakhand)	Dr. KPS Kushwaha	Mycologist (Prof)
		Dr SK Mishra	JRO- Mushroom
		Mr. Vaibhav Singh	Technical Assist.
		Sh. Ramakant Singh	Jr. Assist./Fieldman
		Shri Rakesh Singh	Typist/clerk
		Sh. Deo Kumar	Beldar
6.	Dept of Plant Pathology, Collage of Horticulture and Forestry, Central Agricultural University, Pasighat - 791 102 (Arunachal Pradesh)	Dr. RC Shakywar	Assistant Professor
7.	AICRP on Mushroom, College of Agriculture, Pune-411 005 (MS)	Dr. D.B.Shinde	Mycologist
		Dr. AC Jadhav	Jr. Mycologist
		Shri V. K. Bhalerao	Jr. Res. Asstt
		Shri. N. G. Desai	Agril. Asstt.
		Vacant	LDC/Typist
		Vacant	Beldar
8.	Mushroom Research Laboratory, Dept. of Plant Pathology, Indira Gandhi Krishi Vishwavidyalaya, Raipur - 492 006 (Chhattisgarh)	Dr. C.S.Shukla	Mycologist
		Dr. Harvinder Singh	Assistant Mycologist
		Shri B. L. Sinha	Field Assistant
		Shri R. K. Pandey	LDC
		Shri A. R. Sahu	Peon (Beldar)
9.	Department of Microbiology, Faculty of Basic Sciences and Humanities, Rajendra Agricultural University, Pusa (Samastipur) - 848 125 (Bihar)	Dr. Dayaram	Associate Professor
10.	Dept. of Plant Pathology, Rajasthan Collage of Agriculture, Maharana Pratap University of Agric. & Tech., Udaipur - 313 001 (Rajasthan)	Dr. S.S. Sharma	Mycologist
		Mr. A. K. Nagda	Lab. Assistant
		Mrs. Kala Nath	Field Supervisor
		Mr. Nathu Singh	L.D.C.
		Mr. Kishan Singh	Beldar
11.	Department of Plant Pathology	Dr. Lulu Das	Mycologist

	College of Agriculture Vellayani – 695 522 Thiruvananthapuram, (Kerala)	Ms. Deepa Rani	Technical Assistant
12.	CSK HPKV, Palampur (HP)	Dr. Subhash Dhancholia	Prof. (Plant Pathology)
C. State Govt based Coordinating Centres			
1.	Haryana Agro Industrial Corporation R & D Centre, Opp. DCR University, G.T. Road, Murthal, Sonapat (Haryana)	Dr. Ajay Yadav	Scientist
D	Cooperating centres		
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.	ICAR-VPKAS Almora, 263 601, Uttarakhand	Dr. KK Mishra	Sr. Scientist
3.	Division of Plant Pathology, Faculty of Agriculture, SKUAST-J, Main Campus Chatha, Jammu (J&K)-180 005	Dr Sachin Gupta	Assist. Prof.
4.	Mushroom Research and Training Centre, Division of Plant Pathology, SKUAST-Kashmir, Shalimar, PIN 191121, Kashmir	Dr Shaheen Kauser	Sr. Scientist
5.	Dept of Plant Pathology, Assam Agricultural University, Jorhat-785013, District Jorhat, Assam	Dr. Dilip Kumar Sarmah	Principal Scientist
6.	Dept. of plant Pathology, SVBPU&T, Meerut (UP)- 25011	Dr Gopal Singh	Associate Prof.
7.	Dept. of Plant Pathology, Faculty of Agriculture, Bidhan Chandra Krishi Vishwavidyalaya, Mohanpur (WB)- 741 252	Dr (Ms) Rishu Sharma	Assist. Prof.
8.	Deptt. Of Plant Pathology, SD Agricultural University Sardar, Krushinagar – 385506 (Gujrat)	Dr. K.K. Patel	Associate Prof.
9.	Dept. of Plant Pathology, SV Agriculture College, Tirupati- 517 502	Mr. Gurivi Reddy	Assist. Prof.

9.
BUDGET / RELEASED 2016-17

Centre	Recuriing Contingency (Rs. Lakh)				NEH		TSP		Non-Recurring Contingency (Rs. Lakh)		Total (Rs. Lakh)
	Estt. Charges		Contingency including FLD and TA						Equipments and Works		
	a	b	a	b	a	b	a	b	a	b	
PAU, Ludhiana	40.00	40.00	3.50	3.50	--	--	--	--	--	--	43.50
TNAU, Coimbatore	30.00	30.00	3.50	3.50	--	--	--	--	--	--	33.50
MPKV, Pune	32.300	32.300	3.20	3.20	--	--	--	--	--	--	35.50
GBPUA&T, Pantnagar	8.00	8.00	1.80	1.80	--	--	--	--	--	--	9.80
IGKVV, Raipur	14.00	14.00	0.80	0.80	--	--	2.00	2.00	--	--	16.80
MPUAT, Udaipur	20.70	20.70	1.40	1.40	--	--	--	--	--	--	22.10
KAU, Kerala	15.00	15.00	3.50	3.50	--	--	--	--	--	--	18.50
HAU, Hisar	3.00	3.00	1.80	1.80	--	--	--	--	--	--	4.70
OUAT, Bhubneshwar	--	--	1.30	1.30	--	--	--	--	--	--	1.30
RAU, Samastipur	--	--	0.30	0.30	--	--	--	--	--	--	0.30
CAU Pasighat	5.00	5.00	1.40	1.40	1.50	1.50	--	--	--	--	7.90
HAIC, Murthal	--	--	1.70	1.70	--	--	--	--	--	--	1.70
HPKV, Palampur	--	--	1.20	1.20	--	--	--	--	--	--	1.20
ICARRC Estern region, Ranchi	--	--	0.30	0.30	--	--	--	--	--	--	0.30
ICAR RC for NEH Region	--	--	2.60	2.60	4.00	4.00	--	--	--	--	6.60
ICAR RC, Sikkim	--	--	0.40	0.40	4.00	4.00	1.00	1.00	--	--	5.40
ICAR RC, Arunachal Pradesh	--	--	0.40	0.40	4.50	4.50	--	--	--	--	4.90
ICAR RC, Nagaland	--	--	0.40	0.40	4.00	4.00	1.00	1.00	--	--	5.40
ICAR RC, Mizoram	--	--	0.40	0.40	4.00	4.00	1.00	1.00	--	--	5.40
ICAR RC, Tripura	--	--	0.40	0.40	4.00	4.00	1.00	1.00	--	--	5.40
ICAR RC, Manipur	--	--	0.40	0.40	4.00	4.00	1.00	1.00	--	--	5.40
ICAR-CARI, Port Blair	--	--	1.40	1.40	--	--	--	--	--	--	1.40
IIHR, Bangalore	--	--	1.40	1.40	--	--	--	--	--	--	1.40

UHF, Nauni	--	--	1.60	1.60	--	--	--	--	--	--	1.60
VPKAS, Almora	--	--	1.20	1.20	--	--	--	--	--	--	1.20
SKUAST, Kashmir	--	--	1.45	1.45	--	--	--	--	--	--	1.45
SKUAST, Jammu	--	--	1.30	1.30	--	--	--	--	--	--	1.30
AU Assam	--	--	1.40	1.40	--	--	--	--	--	--	1.40
SVBP, Meerut	--	--	1.30	1.30	--	--	--	--	--	--	1.30
BCKVV, Kalyani	--	--	1.65	1.65	--	--	--	--	--	--	1.65
DAU, Gujrat	--	--	0.40	0.40	--	--	--	--	--	--	0.40
ANGRAU Hyderabad	--	--	1.30	1.30	--	--	--	--	--	--	1.30
Total	168.00	168.00	11.20	11.20	33.80	33.80	7.00	7.00	--	--	250.00

a- sanctioned amount

b- actual release

** = The funds are released to ICAR-RC, Barapani for further release to its regional centres.