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All India Coordinated Research Project on Mushroom



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ICAR-Directorate of Mushroom Research

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(Indian Council of Agricultural Research)

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

ANNUAL REPORT 2018-19
All India Coordinated Research Project on Mushroom
ICAR-Directorate of Mushroom Research
Solan - 173 213, India

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CONTENTS

	Page No.
<i>Preface</i>	
<i>Summary</i>	
Introduction	
Mandate and Objectives	
Technical Programme (2017-18)	
Research Progress (2017-18)	
Collection, Identification and Conservation of Wild Edible Germplasm	
Extension activities	
Publications	
Personalia	
Budget	



PREFACE

Coming human generations shall remember the current era as the one with a frenetic pace of knowledge generation and its immediate application in the technology about which it is rightly said that if it works, it is out of date. Mushroom science as well as production technology has also witnessed newer innovations and applications; annual world production of mushrooms has crossed 38 million tonnes. Also India has registered a staggering twenty- fold increase in production of mushrooms in the last two decades and the mushroom production has reached up to 1.55 lakh tons in 2018. Still in comparison to world mushroom production, India contributes less than 1%. On the other hand with a similar population structure, China has now contributing about 80% of the total world mushroom production. China is an example of success through low cost community based technology for mushroom production and diversification of specialty mushrooms making it a leading mushroom producing country in the world.

With varied agro-climatic conditions, abundant agricultural residues and plenty of manpower, India has tremendous potential for cultivation of different mushrooms. The country generates more than 700 million tons of crop residues per annum, a large amount of which is either burnt or left in the fields for natural decomposition. It leads to environmental pollution and adversely affects soil health. Mushroom cultivation is an ideal tool for converting agricultural residues into nutritious food and recycles the agrowaste in to excellent organic manure for field and horticultural crops. With the mushroom cultivation at community level, we can offer a meaningful solution to todays burning problems of the society i.e. malnutrition, environmental pollution, soil health, depleting land holdings, fall in water table, etc.

Viewing the importance of the crop, National Centre for Mushroom Research and Training (NCMRT), now referred as Directorate of Mushroom Research, was established in 1983 under the aegis of Indian Council of Agricultural Research along with All India Coordinated Research project on Mushroom. This Directorate is the institute exclusively dedicated to mushroom research and development in the country with the help of its 23 Coordinating and 9 Cooperating Centres located in twenty seven states across the country. The Directorate has developed array of technologies for cultivation of different mushrooms in various agro-climatic regions of the country.

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 2018-19 was finalized in the annual workshop organized during 4-5 May 2018 at Maharana Pratap University of Agriculture & Technology, Udaipur (Rajasthan). 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.

(Project Coordinator)



SUMMARY

All India Coordinated Research Project on Mushroom includes twenty three coordinating and nine cooperating centres located in different agro climatic zones in twenty seven states of India to test and validate the technologies or to identify varieties developed at Directorate of Mushroom Research, Solan and accomplish participatory research at other centres in various regions of India to promote climate-wise mushroom cultivation in India to reduce the cost of cultivation. During the year under report (2018-19), 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 4-5 May 2018 at Maharana Pratap University of Agriculture & Technology, Udaipur (Rajasthan).

Different Centres have reported the collection of specimens of wild mushrooms during the year and about 466 collections have been made and a total of 342 specimens were deposited at the DMR Gene Bank with passport data and a total of 130 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 2018-19, seven experiments were conducted on strainal evaluation of six different mushrooms i.e. white button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus* spp.), paddy straw mushroom (*Volvariella volvacea*), milky mushroom (*Calocybe indica*), lion's mane mushroom and shiitake mushroom (*Lentinula edodes*) at various centres. Strain evaluation trials of white button mushroom were on Advance varietal trial for five selected white accessions of *Agaricus bisporus*. In the trials conducted using the short method compost, the maximum yield of 24.66 kg per 100 kg of compost was recorded in the strain AVTB-18-03 at Samastipur centre followed by 24.33 kg in AVTB-18-02 at the same centre. All the strains were taken to Advance varietal trial-2 this year also.

In the IVT of button mushroom, ten selected strains of white button mushroom were evaluated. In the trials conducted using the short method compost, the maximum yield of 24.33 kg per 100 kg of compost was recorded in the strain IVTB-18-04 at Samastipur centre followed by 22.11 kg in IVTB-18-07 at the same centre. The strain IVTB-18-07 performed the best at all the centres giving average yield of 17.13 kg/100 kg compost followed by IVTB-18-08. Out of ten strains five strains were selected for AVT-1.

The trial on evaluation of *Volvariella volvacea* strain was assigned at eight centres and a total of six strains of *Volvariella volvacea* were tested. The maximum yield of 17.34 kg/100 kg of dry substrate was recorded in strain Vv-18-04 at Ludhiana centre followed by Vv-18-02 strain (15.72 kg/100kg dry straw) at the same centre. It was also recorded that the all the test strains performed well with good biological efficiency at the Hiasar centre.

A total of ten high yielding strains of *Pleurotus* species were under evaluation. All the strains have to be evaluated on wheat and paddy straw separately, whichever is available in the area. On wheat straw substrate Pl-18-10 gave maximum biological efficiency of 109.02 kg/100 kg of dry straw at Pune centre. On paddy straw substrate, maximum biological efficiency of 133.5 kg/100 kg of dry straw was recorded at Sikkim in Pl-18-03 strain.



Advance varietal trial-1 for high yielding strains of Milky mushroom (*Calocybe indica*) was conducted with six strains of milky mushroom at fourteen different Centres on wheat straw and paddy straw substrate based upon availability. On wheat straw based substrate, the maximum yield of 101.77 kg/ 100 kg straw was obtained at the Udaipur centre in CI-18-06 strain followed by CI-18-05 strain (86.38 kg/100 kg straw) at the same centre. On paddy straw based substrate, the maximum yield of 134.26 kg/ 100 kg straw was obtained at the Coimbatore centre in CI-18-06 strain followed by CI-18-03 strain (129.90 kg/100 kg straw) at the same centre.

Advance Varietal trial-2 of Shiitake mushroom was allotted to sixteen different centres and ten strains of shiitake mushroom (LE-18-01 to LE-18-10) were to be evaluated. The evaluation was to be done on two substrates i.e. saw dust and wheat straw whatever is available easily. The maximum biological efficiency of 149.00 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in LE-18-05 followed by 139.52 kg / 100 kg saw dust in the strain LE-18-01 at the same centre. On wheat straw based substrate, LE-18-02 performed best with 102.28 kg / 100 kg of dry substrate at Jammu centre.

Initial varietal trial- 18 of Lions Maine Mushroom (*Hericium erinaceus*) was allotted to eleven different centres and nine strains of *Hericium erinaceus* mushroom (IVTH-18-01 to IVTH-18-09) were to be evaluated. The maximum biological efficiency of 208.52 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in IVTH-18-06 followed by 180.35 kg / 100 kg saw dust substrate in the strain IVTH-18-05 at the same centre. The mushroom could not perform well on wheat straw based substrate.

In crop production, second Yield trials for identification of *Pleurotus* species suitable for different parts of country was assigned to 26 different centres to be conducted on wheat or paddy straw whichever is available. A total of eight high yielding strains of *Pleurotus* species were under evaluation trial. A total of eleven centres have conducted this experiment on wheat straw. The experiment was conducted to identify the strains/species of *Pleurotus* for cultivation in different agro-climatic regions. It was observed from the experiment that in P-18-02 has performed the best amongst all the strains tested at Udaipur centre. On paddy straw based substrate, P-18-01 performed the best amongst all the strains tested at Coimbatore centre with an average yield of 127.27 kg/100 kg paddy straw.

In crop production, evaluation of different compost formulation for button mushroom was assigned to seven different centres Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur and Samastipur. The compost formulae used is given. Only Ludhiana centre has reported the successful results. The Prepared compost parameters were recorded to be good in compost prepared through different formulation. The results showed that yield of compost made by different composition have different yield. Very low yields were recorded in formulation with mustard straw and Sugarcane bagasse. The quality of the produce was at par in all the compost, however, first harvest time was very high in compost formulations with mustard straw and Sugarcane bagasse as base material.

In crop protection experiments, Management of Yellow mould in Button mushroom experiment was assigned to see the effect of Single super phosphate on the incidence of yellow mould disease and its control at the farmer's level. The experiment was planned with five treatments with 4 replications each and each replication of 6 bags of 10 kg compost in RBD. The experiment was assigned to for Murthal, Ludhiana, Hisar, Pantnagar and Solan. None of the centres has performed this experiment.

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. DMR - AN INTRODUCTION

The All India Coordinated Research Project on Mushroom (AICRP-M) was launched during VI Five-Year Plan on 01.04.1983 with its Headquarters at Directorate of Mushroom Research, Solan (HP) to validate 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, ICAR-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, Passighat (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 coornating 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 Krishi Vidyapeeth, 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 Agricuilture and Technology, Bhubaneswar (Orissa)
- Rajendra Agricultural University, Samastipur, Pusa (Bihar)
- College of Horticulture and Forestry, Central Agricultural University, Pasighat (Arunchal Pradesh)
- CSK HPKV, Palampur (HP)

State Govt based Coorinating Centre

- HAIC Murthal (Haryana)



ICAR Institute based cooernating centres

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

Co-operating Centres

- Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan (HP).
- ICAR-VPKAS, Almora (Uttrakhand)
- 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 (Gujrat)
- Acharya NG Ranga Agri. Uni., Rajendranagar (Hyderabad)

The last Group meeting of workers of AICRPM was held on 4-5 May 2018 at Maharana Pratap University of Agriculture & Technology, Udaipur (Rajasthan). During the meeting the progress of last year (2017-18) was monitored and technical programme for 2018-19 was finalized.



2. MANDATE AND OBJECTIVES

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.



Geographical location of different Centres of AICRP on Mushroom



3. TECHNICAL PROGRAMME OF WORK FOR 2018-19

I. CROP IMPROVEMENT

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

a) Participating centers	All centers 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. • Primarily identification of mushroom by software Matchmaker (http://s158336089.onlinehome.us/lan/) or by molecular sequencing (ITS, COI, LSU etc.) • 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 needed, any staff may be sent along with the culture and other information. • Information regarding ethnic usage, medicinal importance and traditional usage (even it is duplicated)
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	

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

* Report to be sent by the end of December along with colored photograph, dried specimens and cultures and for the accessions collected.

* 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
 - Attachment: Free, adnasced (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, medicinal value and traditional usage
- Photographs of natural specimen showing habitat and after taking out from the soil showing cap, stem, ring, gills, volva and stem base
- Matchmaker identification result
- Sequencing results (if any)



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

a) Participating centers	Pantnagar, Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur Samastipur and Solan
b) Experimental details	Experimental Design- RBD Replication-5 Bags per replication-10 Bag Size- 10 kg Treatment-05 (AVTB-18-01 to AVTB-18-05)
c) Methodology to be adopted and substrate	Short Method Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0, 2, 4, 6, 8 (fill)/phase-II (6-7 days). Compost will be ready in 18 days. Ingredients to be used are wheat straw - 1000 kg, poultry manure-500 kg, urea-15 kg, wheat bran-70 kg, gypsum-40 kg. Data for compost N(1.75 to 2.2%), colour, pH (7.2 to 7.8), moisture (<60%), ammonia, bulk density (kg per m ³) may be reported for each trial
d) Spawning rate to be used	1 % of wet compost
e) Data to be recorded during 4 weeks cropping	• The yield data should be recorded in tabulated form replication wise. • The replicates should be randomized in cropping rooms in different tiers in RBD. One replicate may be kept on one tier • Watering should be restricted to wetting of casing material. • Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted to 7.2-7.5 with 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.
f) Environmental conditions to be maintained inside cropping room	Spawn run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppm Case run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppm Cropping: Bed Temp 16-18°C, RH 80-85%, CO ₂ <1000ppm
g) Bag size	20"x24" (polyethylene - 150 gauge)

Note: The project coordinator, Scientist In-charge-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 and Dr. Shwet Kamal

Randomized Layout				
Block - 1				
1	2	3	4	5
T4	T1	T2	T5	T3
Block - 2				
1	2	3	4	5
T2	T5	T3	T4	T1
Block - 3				
1	2	3	4	5
T5	T1	T2	T3	T4
Block - 4				
1	2	3	4	5
T1	T2	T4	T5	T3
Block - 5				
1	2	3	4	5
T3	T5	T2	T1	T4

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	4
Treatments	4
Error	16
Total	24

Exp-03. Initial Varietal trial-18 for selected white accessions of *Agaricus bisporus*

a) Participating centers	Pantnagar, Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur Samastipur and Solan
b) Experimental details	Experimental Design- RBD Replication-4 Bags per replication-5 Bag Size- 10 kg Treatment-10 (IVTB-18-01 to IVTB-18-10)
c) Methodology to be adopted and substrate	Short Method Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0, 2, 4, 6, 8 (fill)/phase-II (6-7 days). Compost will be ready in 18 days. Ingredients to be used are wheat straw - 1000 kg, poultry manure-500 kg, urea-15 kg, wheat bran-70 kg, gypsum-40 kg. Data for compost N(1.75 to 2.2%), colour, pH (7.2 to 7.8), moisture (< 60%), ammonia, bulk density (kg per m ³) may be reported for each trial
d) Spawning rate to be used	1 % of wet compost
e) Data to be recorded during 4 weeks cropping	• The yield data should be recorded in tabulated form replication wise. • The replicates should be randomized in cropping rooms in different tiers in RBD. One replicate may be kept on one tier • Watering should be restricted to wetting of casing material. • Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted to 7.2-7.5 with 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.
f) Environmental conditions to be maintained inside cropping room	Spawn run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppm Case run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppm Cropping: Bed Temp 16-18°C, RH 80-85%, CO ₂ <1000ppm
g) Bag size	20"x24" (polyethylene - 150 gauge)

Note: The project coordinator, Scientist In-charge-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 and Dr. Shwet Kamal

Randomized Layout									
Block - 1									
1	2	3	4	5	6	7	8	9	10
T1	T7	T2	T3	T4	T10	T8	T5	T6	T9
Block - 2									
1	2	3	4	5	6	7	8	9	10
T4	T10	T6	T7	T9	T3	T5	T1	T8	T2
Block - 3									
1	2	3	4	5	6	7	8	9	10
T10	T5	T2	T7	T1	T3	T9	T4	T8	T6
Block - 4									
1	2	3	4	5	6	7	8	9	10
T10	T9	T7	T3	T5	T8	T4	T6	T2	T1

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	3
Treatments	9
Error	27
Total	39



Expt. 04: Initial Varietal trial for strains of Paddy Straw Mushroom, *Volvariella volvacea*

a) Participating centers	Coimbatore, Bhubaneswar, Ranchi, Ludhiana, Hisar, Raipur, Vellayani, and Solan
b) Experimental details	Experimental Design- RBD Replication-3 Beds -3 beds of each strain 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) Treatment-10
c) Strains to be evaluated	Vv-18-01 to Vv-18-10
d) Substrate	Paddy straw bundles (45 cm x 15 cm) – 500 g each soaked for 12-14 hours in CaCO ₃ mixed water (@1.5%)
e) Spawning rate to be used	1 % of wet compost
f) Data to be recorded	• Substrate moisture • Substrate temperature during spawn run, pinning and cropping • Relative humidity during cropping • Time taken for mycelial colonization of the substrate • Time taken for first harvest (days post-spawning) • Mushroom yield weekly (kg/100 kg dry substrate) for 2 weeks cropping period • Average fruiting body weight • Incidence of diseases/insect-pests, if any • Fruiting body quality of unopened mushroom (length, breadth, shape, colour and dry weight) • Enclosure of ANOVA with data sheet

Note: The project coordinator, Scientist Incharge-AICRP and the concerned scientist must be informed 15 days before the start of the experiment at these emails: director.mushroom@icar.gov.in; anilrao_mpp@yahoo.co.in; shwetkamall@gmail.com. Reporting of the experiments and results to be done to and cultures may also be obtained from Dr. Anil Kumar.

Randomized Layout									
Block - 1									
1	2	3	4	5	6	7	8	9	10
T9	T3	T6	T8	T4	T7	T2	T5	T10	T1
Block - 2									
1	2	3	4	5	6	7	8	9	10
T10	T3	T7	T1	T4	T9	T5	T8	T2	T6
Block - 3									
1	2	3	4	5	6	7	8	9	10
T3	T10	T2	T9	T7	T1	T5	T8	T4	T6

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	2
Treatments	9
Error	18
Total	29

5a) On wheat straw	
a) Participating centers	Pune, Raipur, Samastipur, Pasighat, Pantnagar, Vellayani, Ranchi, Coimbatore, Bhubaneswar, Udaipur, Meerut, Hisar, Barapani, Manipur, Tripura, Arunachal Pradesh, Kalyani, Srinagar, Port Blair, Bangalore, Jammu, Sikkim, Mizoram, Palampur, Almora, Jorhat and Solan
b) Substrate and method	Wheat straw Substrate treatment: Hot water treatment 65°C for 60 min for wheat straw Dry for minimum 4 h under openpH to be adjusted to 7.50 with CaCO ₃
c) Experimental Design	Experimental Design- RBD Treatment-10 Replication-3 Bags per replication-10 Bag Size- 5 kg Treatments- PL-18-01, PL-18-02, PL-18-03, PL-18-04, PL-18-05, PL-18-06, PL-18-07, PL-18-08, PL-18-09, PL-18-10
e) Temperature and humidity required during trails	Temp range – 22-28 °C Humidity - 85-90 % Light requirement- 800 lux
f) Spawn rate	10% spawn for per kg of dry substrate
h) Data to be recorded	• All bags should be opened starting from first flush • Days taken for spawn run. • Days taken for pinhead formation. • Yield data for three flushes. • Time taken for I, II and III flush • Data of maximum and minimum temp of the morning 10.00 AM must be supplied with yield data. Results will not be considered without this data. • Fruit body observations of individual strain • Pileus size, colour, stipe length, stipe thickness. • The data on pileus and stipe size/thickness are to be recorded for at least 10 fruit bodies • Report of any pest and diseases • Photographs of each strain
i) Information to be provided	• 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)
5b) On paddy straw	
a) Participating centers	Pune, Raipur, Samastipur, Pasighat, Pantnagar, Vellayani, Ranchi, Coimbatore, Bhubaneswar, Udaipur, Meerut, Hisar, Barapani, Manipur, Tripura, Arunachal Pradesh, Kalyani, Srinagar, Port Blair, Bangalore, Jammu, Sikkim, Mizoram, Palampur, Almora, Jorhat and Solan
b) Substrate and method	Paddy straw Substrate treatment: Hot water treatment 80°C for 45-60 min for paddy straw Dry for minimum 4 h under openpH to be adjusted to 7.50 with CaCO ₃



c) Experimental Design	Experimental Design- RBD Treatment-10 Replication-3 Bags per replication-10 Bag Size- 5 kg Treatments- PL-18-01, PL-18-02, PL-18-03, PL-18-04, PL-18-05, PL-18-06,PL-18-07, PL-18-08, PL-18-09, PL-18-10
e) Temperature and humidity required during trails	Temp range – 22-28°C Humidity - 85-90%Light requirement- 800 lux
f) Spawn rate	10% spawn for per kg of dry substrate
h) Data to be recorded	• All bags should be opened starting from first flush • Days taken for spawn run. • Days taken for pinhead formation. • Yield data for three flushes. • Time taken for I, II and III flush • Data of maximum and minimum temp of the morning 10.00 AM must be supplied with yield data. Results will not be considered without this data. • Fruit body observations of individual strain • Pileus size, colour, stipe length, stipe thickness. • The data on pileus and stipe size/thickness are to be recorded for at least 10 fruit bodies • Report of any pest and diseases • Photographs of each strain
i) Information to be provided	• 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)

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;anupambarh6@gmail.com. Reporting of the experiments and results to be done to and cultures may also be obtained from Dr. AnupamBarh.

Randomized Layout										
Block - 1										
1	2	3	4	5	6	7	8	9	10	
T9	T3	T6	T8	T4	T7	T2	T5	T10	T1	
Block - 2										
1	2	3	4	5	6	7	8	9	10	
T10	T3	T7	T1	T4	T9	T5	T8	T2	T6	
Block - 3										
1	2	3	4	5	6	7	8	9	10	
T3	T10	T2	T9	T7	T1	T5	T8	T4	T6	

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	2
Treatments	9
Error	18
Total	29

Expt. 06. Advance varietal trial-1 for high yielding strains of Milky mushroom (*Calocybe indica*)

6a) Wheat straw	
a) Participating centers	Coimbatore, Kerala, Bhubaneswar, Samastipur, Arunachal Pradesh, Tripura, Jammu, Ludhiana, Udaipur, Raipur, Pune and Solan, Meerut, Pantnagar, Murthal
b) Substrate and method	Wheat strawHot water treatment (boiling the straw bits for 60 min at 65-70°C). The substrate is shade dried to maintain 60-65% moisture at the time of bag filling)
c) Experimental design	Experimental Design- RBD Replication-5 Bags per replication-6 Bag Size- 5 kg (60 x 30 cm and after spawn run cut in two half) Treatments -06 (CI-18-01 to CI-18-06)
d) Spawn rate	4% (on wet weight basis)
e) 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
f) Production technology to be followed	• Method of spawning – layer spawning 4% wet weight basis • Spawn run temp – 28-30°C; RH – 80%; Light – 800 lux· 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 • Light to be provided for maximum duration during entire cropping cycle.
6b) Paddy straw	
a) Participating centers	Coimbatore, Kerala, Bhubaneswar, Samastipur, Arunachal Pradesh, Tripura, Jammu, Ludhiana, Udaipur, Raipur, Pune and Solan, Meerut, Pantnagar, Murthal
b) Substrate and method	Paddy strawHot water treatment (boiling the straw bits for 45-60 min at 80°C). The substrate is shade dried to maintain 60-65% moisture at the time of bag filling)
c) Experimental design	Experimental Design- RBD Replication-5 Bags per replication-6 Bag Size- 5 kg (60 x 30 cm and after spawn run cut in two half) Treatments -06 (CI-18-01 to CI-18-06)
d) Spawn rate	4% (on wet weight basis)
e) 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
f) Production technology to be followed	• Method of spawning – layer spawning 4% wet weight basis • Spawn run temp – 28-30°C; RH – 80%; Light – 800 lux· 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 • 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; satish132@gmail.com. Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. Satish Kumar.



Randomized Layout						
Block - 1						
1	2	3	4	5	6	
T2	T4	T5	T1	T3	T6	
Block - 2						
1	2	3	4	5	6	
T3	T4	T2	T1	T6	T5	
Block - 3						
1	2	3	4	5	6	
T5	T4	T3	T2	T6	T1	
Block - 4						
1	2	3	4	5	6	
T6	T1	T2	T5	T4	T3	
Block - 5						
1	2	3	4	5	6	
T6	T3	T4	T2	T1	T5	

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	4
Treatments	5
Error	20
Total	29

Expt . 07: Initial varietal trial-18 of Shiitake mushroom

7a)Sawdust	
a) Participating centers	Murthal, Bangalore, Pantnagar, Manipur, Nagaland, Hisar, Barapani, Nauni, Udaipur, Raipur, Coimbatore, Srinagar, Pasighat, Jammu, Meerut, Sikkim and Solan
b) Substrate and supplements	Saw dust (Broad leaved hard wood trees)Supplement - wheat bran @ 20% and treatment with 1% CaCO ₃ on dry weight basis
c) Experimental design	Experimental Design- RBD Replication-5 Bags per replication-6 Bag Size- 1.5 kg (wet weight) Treatments -LE-18-01 to LE-18-05
d) Method of substrate preparation	Autoclaving for 2 hrs
e) Spawn rate	5% (on wet weight basis)
f) 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
g) Production technology to be followed	• Take 40kg hard wood broad leaved trees’ saw dust • Mention the saw dust • Add water (55%) for thorough wetting overnight • Add wheat bran and thoroughly mix • Fill in polypropylene bags 2kg each and put ring and cotton plug • Autoclave at 126°C for 2 hour • On cooling spawn aseptically @ 5% wet weight basis. • Incubate at 24°C • After completion of spawn run (about 60 days) allow them to turn brown. • Remove the PP bags and dip the blocks in chilled water (4-5°C) for about 10 minutes. • Keep the block for fruiting at <20-22°C • Give rest 2-3 weeks • Repeat 9-10 steps again.

7b) Wheat straw

- a) Participating centers

Murthal, Bangalore, Pantnagar, Manipur, Nagaland, Hisar, Barapani, Nauni, Udaipur, Raipur, Coimbatore, Srinagar, Pasighat, Jammu, Meerut, Sikkim and Solan
- b) Substrate and supplements

Wheat strawSupplement - wheat bran @ 20% and treatment with 1% CaCO₃ on dry weight basis
- c) Experimental design

Experimental Design- RBD
Replication-5
Bags per replication-6
Bag Size- 1.5 kg (wet weight)
Treatments -LE-18-01 to LE-18-10
- d) Method of substrate preparation

Autoclaving for 2 hrs
- e) Spawn rate

5% (on wet weight basis)
- f) 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
- g) Production technology to be followed

• Take 40kg hard wood broad leaved trees’ saw dust

• Mention the saw dust

• Add water (55%) for thorough wetting overnight

• Add wheat bran and thoroughly mix

• Fill in polypropylene bags 2kg each and put ring and cotton plug

• Autoclave at 126°C for 1 hour

• On cooling spawn aseptically @ 5% wet weight basis.

• Incubate at 24°C

• After completion of spawn run (about 60 days) allow them to turn brown.

• Remove the PP bags and dip the blocks in chilled water (4-5°C) for about 10 minutes.

• Keep the block for fruiting at <20-22°C

• 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. Reporting of the experiments and results to be done to and Cultures may also be obtained from Mr. Sudheer Kumar Annepu.
- | Randomized Layout | | | | | | |
|-------------------|----|----|----|----|----|--|
| Block - 1 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| T2 | T4 | T5 | T1 | T3 | T6 | |
| Block - 2 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| T3 | T4 | T2 | T1 | T6 | T5 | |
| Block - 3 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| T5 | T4 | T3 | T2 | T6 | T1 | |
| Block - 4 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| T6 | T1 | T2 | T5 | T4 | T3 | |
| Block - 5 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| T6 | T3 | T4 | T2 | T1 | T5 | |
- | Outline of ANOVA | |
|------------------|--------------------|
| Source | Degrees of Freedom |
| Blocks | 4 |
| Treatments | 5 |
| Error | 20 |
| Total | 29 |
- Hkk—vu-i-&[kEc vuI/kku fun'kky;
- 13



Exp-08. Initial varietal trial- 18 of Lions Maine Mushroom *Hericium erinaceus*

8a) On saw dust	
Participating center	Samstipur, Pasighat, Nauni, Almora, Jammu, Raipur, Pantnagar, Udiapur, Hissar, Meerut, Murthal, Solan
Substrate	Saw dust
Supplement	20% wheat bran
Quantity/ bag	2kg
Method of substrate preparation	Autoclaving (121°C for 2hrs)
Spawning rate	@ 3% wet weight basis
Replication	5
No. of bags per replication	4
Number of strains	9
Temperature for spawn run	23-25R°C
Temperature for fruiting	18-20R°C
Observations to be recorded	Time taken for spawn runBEincidence of pests and diseases, if any
8b) On Wheat straw	
Participating center	Samstipur, Pasighat, Nauni, Almora, Jammu, Raipur, Pantnagar, Udiapur, Hissar, Meerut, Murthal, Solan
Substrate	wheat straw
Supplement	20% wheat bran
Quantity/ bag	2kg
Method of substrate preparation	Autoclaving (121R°C for 2hrs)
Spawning rate	@ 3% wet weight basis
Replication	5
No. of bags per replication	4
Number of strains	9
Temperature for spawn run	23-25R°C
Temperature for fruiting	18-20°C
Observations to be recorded	Time taken for spawn run, BEincidence of pests and diseases, 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. Reporting of the experiments and results to be done to and Cultures may also be obtained from Mr. Sudheer Kumar Annepu.

Randomized Layout	
Block - 1	
1	2
3	4
5	6
7	8
9	
T7	T9
T1	T4
T2	T5
T6	T8
T3	T9
Block - 2	
1	2
3	4
5	6
7	8
9	
T9	T1
T4	T5
T2	T6
T8	T3
T7	
Block - 3	
1	2
3	4
5	6
7	8
9	
T1	T3
T9	T8
T2	T7
T5	T6
T4	
Block - 4	
1	2
3	4
5	6
7	8
9	
T1	T7
T5	T8
T3	T9
T4	T2
T6	
Block - 5	
1	2
3	4
5	6
7	8
9	
T1	T7
T9	T5
T3	T4
T2	T8
T6	

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	4
Treatments	8
Error	32
Total	44

II. CROP PRODUCTION

Expt. 09: Second Yield trials for identification of *Pleurotus* species suitable for different parts of country

9a) Wheat straw	
a) Participating centers	Pune, Raipur, Samastipur, Pasighat, Pantnagar, Vellayani, Ranchi, Coimbatore, Bhubaneswar, Udaipur, Meerut, Hisar, Barapani, Manipur, Tripura, Arunachal Pradesh, Kalyani, Srinagar, Port Blair, Bangalore, Jammu, Sikkim, Mizoram, Palampur, Almora, Jorhat and Solan
b) Substrate	- Wheat straw - Substrate treatment: Hot water treatment 65°C for 60 min for wheatstraw - Dry for minimum 4 h under open - pH to be adjusted to 7.50 with CaCO₃
c) Experimental Design	Experimental Design- RBD Replication-3 Bags per replication-10 Bag Size- 5 kg Treatment-08 (P17-01 to P17-08)
e) Season for laying trials	Temp range– 15-34°C
f) Spawn rate	10% of dry substrate
h) Data to be recorded	- Days taken for spawn run. - Days taken for pinhead formation. - Yield data for three flushes - 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 - The data on pileus and stipe size/thickness are to be recorded for atleast 10 fruit bodies - Photographs of each strain
i) Information to be provided	- Substrate used and substrate preparation method - 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)
9b) Paddy straw	
a) Participating centers	Pune, Raipur, Samastipur, Pasighat, Pantnagar, Vellayani, Ranchi, Coimbatore, Bhubaneswar, Udaipur, Meerut, Hisar, Barapani, Manipur, Tripura, Arunachal Pradesh, Kalyani, Srinagar, Port Blair, Bangalore, Jammu, Sikkim, Mizoram, Palampur, Almora, Jorhat and Solan
b) Substrate	- Wheat straw - Substrate treatment: Hot water treatment 80°C for 45-60 min for paddy straw - Dry for minimum 4 h under open - pH to be adjusted to 7.50 with CaCO₃



c) Experimental Design	Experimental Design- RBD Replication-3 Bags per replication-10 Bag Size- 5 kg Treatment-08 (P17-01 to P17-08)
e) Season for laying trials	Temp range 15-34°C
f) Spawn rate	10% of dry substrate
h) Data to be recorded	• Days taken for spawn run. • Days taken for pinhead formation. • Yield data for three flushes • 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 • The data on pileus and stipe size/thickness are to be recorded for atleast 10 fruit bodies • Photographs of each strain
i) Information to be provided	• Substrate used and substrate preparation method • 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)

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; anupambarh6@gmail.com. Reporting of the experiments and results to be done to and Cultures may also be obtained from Dr. AnupamBarh.

Randomized Layout							
Block - 1							
1	2	3	4	5	6	7	8
T3	T4	T5	T7	T2	T1	T8	T6
Block - 2							
1	2	3	4	5	6	7	8
T2	T6	T5	T7	T4	T3	T1	T8
Block - 3							
1	2	3	4	5	6	7	8
T4	T8	T1	T6	T5	T2	T3	T7

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	2
Treatments	7
Error	14
Total	23

Exp-10. Evaluation of different compost formulation for button mushroom

Compost formula 1

Wheat straw: 1000kg; Chicken manure: 400kg; Wheat bran: 100kg; Urea: 14.5kg; Gypsum: 30kg

Compost formula 2

Mustard straw: 1000kg; Chicken manure: 400kg; Wheat bran: 45kg; Urea: 3kg; Gypsum: 40kg.

Compost formula 3

Paddy straw: 1000kg; Chicken manure: 400kg; Urea: 10 Kg; Ammonium sulphate: 10 kg; Gypsum: 80kg

Compost formula 4

Sugarcane baggasse: 1000kg; Chicken manure: 500kg; Cotton seed cake: 25kg; Gypsum: 80kg; Urea: 20 kg. Leach out sugarcane bagasse for 3 days.

10.a) Compost Formula -1 and 2	
a) Participating centers	Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur Samastipur and Solan
b) Experimental details	Experimental Design- RBD Treatment - 2 Replication-10 Bags per replication-10 Bag Size- 10 kg Strain used- NBS-5
c) Methodology to be adopted and substrate	Short Method Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0, 2, 4, 6, 8 (fill)/phase-II (6-7 days). Compost will be ready in 18 days.
d) Spawning rate to be used	1 % of wet compost
e) Data to be recorded during 4 weeks cropping	• The yield data should be recorded in tabulated form replication wise. • The replicates should be randomized in cropping rooms in different tiers in RBD. One replicate may be kept on one tier • Watering should be restricted to wetting of casing material. • Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted to 7.2-7.5 with 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. • 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



f) Environmental conditions to be maintained inside cropping room	Spawn run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppmCase run: Bed Temp-24+1°C, RH-90-95%, CO ₂ - >10,000 ppmCropping: Bed Temp 16-18°C, RH 80-85%, CO ₂ <1000ppm
g) Bag size	20"x24" (polyethylene - 150 gauge)
10.b) Compost Formula -3 and 4	
a) Participating centers	Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur Samastipur and Solan
b) Experimental details	Experimental Design- RBD Treatment -2 Replication-10 Bags per replication-10 Bag Size- 10 kg Strain used- NBS-5
c) Methodology to be adopted and substrate	Short Method Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0, 2, 4, 6, 8 (fill)/phase-II (6-7 days). Compost will be ready in 18 days.
d) Spawning rate to be used	1 % of wet compost
e) Data to be recorded during 4 weeks cropping	• The yield data should be recorded in tabulated form replication wise. • The replicates should be randomized in cropping rooms in different tiers in RBD. One replicate may be kept on one tier • Watering should be restricted to wetting of casing material. • Casing material: FYM + SMS (2:1, v/v) both two years old (pH to be adjusted to 7.2-7.5 with 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. • 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
f) Environmental conditions to be maintained inside cropping room	Spawn run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppmCase run: Bed Temp-24+1°C, RH-90-95%, CO ₂ - >10,000 ppmCropping: Bed Temp 16-18°C, RH 80-85%, CO ₂ <1000ppm
g) Bag size	20"x24" (polyethylene - 150 gauge)

III. CROP PROTECTION

Expt. 11. Management of Yellow mould in Button mushroom

a) Participating centers	Murthal, Ludhiana and Solan
b) Substrate	Substrate quantity-10 kg compost/bagNo. of replications- 5 replications each with 6 bags of 10 kg compost/replicate for each strain in RBD.
c) Treatment	• T₁ - inoculated with yellow mould pathogen+spray of single super phosphate @0.5 percent • T₂ - inoculated with yellow mould pathogen+spray of single super phosphate @1.0 percent • T₃ - inoculated with yellow mould pathogen+ mixing of granular SSP at the time of spawning @1.0 percent of wet weight of compost • T₄ -Inoculated untreated • T₅ - un-inoculated untreated
d) Methodology to be adopted	Short Method Preparation of compost by short method in 2 phases (phase-I and phase-II) by following standard procedure (-6, -4, 0, 2,4,6,8 (fill))/phase-II (6-7 days). Compost will be ready in 18 days.Ingredients to be used are wheat straw - 1000 kg, poultry manure-500 kg, urea-15 kg, wheat bran-70 kg, gypsum-40 kg. Data for compost N(1.75 to 2.2%), colour, pH (7.2 to 7.8), moisture (< 60%), ammonia, bulk density (kg per m ³) 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	• 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. • Disease scoring should be recorded. • 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 to be maintained inside cropping room	Spawn run: Bed Temp-24±1°C, RH-90-95%, CO ₂ >10,000 ppm.Case run: Bed Temp-24+1°C, RH-90-95%, CO ₂ - >10,000 ppm.Cropping: Bed Temp 16-18°C, RH 80-85%, CO ₂ - <1000ppm
h) Bag size	20"x24" (polyethylene - 150 gauge)

Note: The project coordinator, Scientist In-charge-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.

Randomized Layout				
Block - 1				
1	2	3	4	5
T3	T4	T1	T5	T2
Block - 2				
1	2	3	4	5
T5	T3	T2	T4	T1
Block - 3				
1	2	3	4	5
T2	T3	T5	T4	T1
Block - 4				
1	2	3	4	5
T1	T2	T5	T3	T4
Block - 5				
1	2	3	4	5
T1	T4	T2	T3	T5

Outline of ANOVA	
Source	Degrees of Freedom
Blocks	4
Treatments	4
Error	16
Total	24

IV. EXTENSION ACTIVITIES

Generation of databases of mushroom farmers, spawn producers and total production of spawn and mushroom in your state

Participating centers: All

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

Participating Centres: All

- Organization of at least 2 training programmes of 5-7 days duration each preferably in March, August and October months of the year.
- Involvement of women in training programmes to empower them and help in creation of self help groups/FPOs.
- Organization of two field days at the farm of the progressive farmer.
- Active participation in Workshops, Kisan-mela and Demonstration etc.



5. Supply of quality mushroom spawn to mushroom growers mentioning with seed labels(time of inoculation, variety, quantity).
6. Feedback on diseases of respective areas.
7. Impact analysis of training programmes and spawn supply data in kg instead of packet
8. Compilation of bulletins, published in regional languages
9. Spawn sold in each quarter must be intimated in quarterly report.
10. 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.



4. RESEARCH PROGRESS

1. CROP IMPROVEMENT

1.1 Advance Varietal trial -1 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 five 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 24.66 kg per 100 kg of compost was recorded in the strain AVTB-18-03 at Samastipur centre followed by 24.33 kg in AVTB-18-02 at the same centre. The

strain AVTB-18-01 performed the best at all the centres giving average yield of 17.99 kg/100 kg compost followed by AVTB-18-03. Overall all the strains have performed well at all the centres (Table 4.1) barring AVTB-18-02 which yielded least i.e. 13.84 kg/100 kg compost.

The average time taken in first harvest (days post casing) was in the range of 16-32 days. The lowest first harvest time (16 days) was recorded at Nauni in strain AVTB-18-01, AVTB-18-03 and AVTB-18-05. Overall the lowest first harvest time of 21.3 days was recorded in AVTB-18-01 followed AVTB-18-03 (Table. 4.2).

Fruit body weight also varied at different centres and was recorded maximum (28.5 g) at

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

A. bisporus strain	Pantnagar	Ludhiana	Murthal	Pune	Solan	Nauni	Palampur	Samastipur	Average
AVTB-18-01	17.22	13.10	22.06	17.26	14.76	19.37	7.53	22.18	17.99
AVTB-18-02	12.52	11.18	8.53	14.14	9.38	16.82	7.17	24.33	13.84
AVTB-18-03	13.67	12.84	20.72	15.46	16.31	18.37	5.81	24.66	17.43
AVTB-18-04	12.26	15.42	14.20	14.35	12.70	19.80	7.47	20.22	15.56
AVTB-18-05	12.41	09.62	17.77	16.32	12.18	22.12	8.65	19.65	15.72
CD (0.05)	1.30	1.32	2.30	2.24	1.65	1.42	1.4	2.463	

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

A. bisporus strain	Pantnagar		Ludhiana		Murthal		Pune		Solan		Nauni		Palampur		Pusa		Average	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
AVTB-18-01	18	16.5	28	9.6	28	9.71	19	9.2	19	12.1	16	10.7	23.0	10.1	19	22.7	21.3	12.6
AVTB-18-02	19	14.41	27	10.4	29	12.9	22	8.9	22	10.2	17	11.2	23.0	9.9	20	28.5	22.4	13.3
AVTB-18-03	19	15.10	27	12.3	32	12.4	18	11	18	10.6	16	10.1	23.0	8.8	20	20.6	21.6	12.6
AVTB-18-04	19	12.72	22	14.8	32	13.3	20	9.6	21	11.2	17	11.0	23.0	9.0	21	24.5	21.9	13.3
AVTB-18-05	19	11.20	30	11.8	31	13.8	20	12	21	12.8	16	10.2	23.0	10.5	22	21.0	22.8	12.9
CD (0.05)	NS	0.42	1.4	0.26	0.8	0.23	1.7	0.9	1.2	0.56	NS	0.16	NS	0.12	NS	3.45		

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



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



Fig 4.6. AVTB-18-04 crop at Ludhiana Centre



Fig 4.7. Cross section of AVTB-18-04



Fig 4.8. AVTB-18-05 crop at Ludhiana Centre



AVTB-18-01



AVTB-18-03



AVTB-18-05

Fig 4.9. AVT crop at Murthal Centre



Fig 4.10. AVTB-18-01 crop at Pune Centre



Fig 4.11. AVTB-18-03 crop at Pune Centre



Fig 4.12. AVTB-18-05 crop at Pune Centre



Fig 4.13. AVT button mushroom crop at Pune Centre



Fig 4.14. AVT crop of button mushroom strains at Solan Centre



Fig 4.15. AVTB-18-03 crop at Nauni Centre



Fig 4.16. AVTB-18-04 at Nauni Centre



Fig 4.17. AVTB-18-05 crop at Nauni Centre



Fig 4.18. AVTB crop of button mushroom strains at Nauni Centre



Fig 4.19. AVTB crop of button mushroom strains at Palampur Centre



Fig 4.20. AVTB crop of button mushroom strains at Pusa Centre

1.2 Initial Varietal trial -1 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 five 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 24.33 kg per 100 kg of compost was recorded in the strain IVTB-18-04 at Samastipur centre followed by 22.11 kg in IVTB-18-07 at the same centre. The strain IVTB-18-07 performed the best at all the centres giving average yield of 17.13 kg/100 kg compost followed by IVTB-18-08. Overall all the strains have performed well at all the centres (Table 4.4) barring Palampur centre where all the strains gave poor yield. At Pantnagar centre only six strains could be evaluated. Hence in averaging, the yield of Palampur centre and

the strains not evaluated at Pantnagar centre was omitted.

The average time taken in first harvest (days post casing) was in the range of 15-36 days. The lowest first harvest time (15 days) was recorded at Pantnagar centre in strain IVTB-18-02. At Pantnagar centre, all the strains took minimum time for first harvest. Overall the lowest first harvest time of 21.9 days was recorded in IVTB-18-01 followed IVTB-18-08 (Table. 4.5).

Fruit body weight also varied at different centres and was recorded maximum (25 g) at Pusa centre (Table 4.5). At headquarters the average fruit body weight ranged between 9.2 to 12.6 g in all the strains. On the basis of average fruit body weight, maximum fruit body weight of 13.4 g was recorded in strain IVTB-18-05 and IVTB-18-09. The quality of fruitbody ascertained by cross section showed that best quality was obtained in IVTB-18-01, IVTB-18-08 and IVTB-18-09 in all the centres.

Table 4.4 Yield of different strains of white button mushroom on long method compost in four weeks cropping

A. bisporus strain	Pantnagar	Ludhiana	Murthal	Pune	Solan	Nauni	Palampur	Samastipur	Average
IVTB-18-01	15.93	12.82	15.9	14.82	15.27	18.90	7.91	17.22	15.84
IVTB-18-02	16.65	11.26	17.3	15.50	12.83	19.10	6.75	19.30	15.99
IVTB-18-03	-	10.30	18.1	14.62	14.45	18.49	6.25	22.36	16.39
IVTB-18-04	14.62	10.08	15	15.46	11.77	17.17	6.93	24.33	15.49
IVTB-18-05	-	06.82	16.1	13.84	9.85	15.81	6.87	18.22	13.44
IVTB-18-06	-	12.62	18.3	16.31	12.62	16.13	7.05	19.66	15.94
IVTB-18-07	-	14.86	20.5	15.61	12.92	15.88	6.42	23.00	17.13
IVTB-18-08	17	15.26	18.1	16.47	13.34	16.87	7.67	22.11	17.02
IVTB-18-09	16	10.85	16.4	17.94	13.89	16.33	7.70	21.05	16.07
IVTB-18-10	16	11.02	17.5	19.22	12.69	16.51	7.90	18.77	15.96
CD (0.05)	0.09	0.68	0.43	2.31	0.26	1.08	NS	2.321	

Table 4.5. Time taken to first harvest and average fruit body weight in A. bisporus strains

A. bisporus strain	Pantnagar		Ludhiana		Murthal		Pune		Solan		Nauni		Palampur		Pusa		Average	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
IVTB-18-01	16	13.3	27	13.5	29	13.1	22.0	11.35	20	12.2	19	9.4	25	10.3	17	18.20	21.9	12.7
IVTB-18-02	15	13.4	29	10.2	30	12.0	22.3	9.96	22	10.2	21	9.8	25	9.0	16	18.00	22.5	11.6
IVTB-18-03	-	-	30	10.8	33	13.1	23.0	11.33	19	11.1	22	10.1	25	10.1	16	22.50	24.0	12.7
IVTB-18-04	21	12.9	35	9.5	32	12.9	21.6	10.57	21	9.2	21	11.9	25	8.4	18	24.30	24.3	12.5
IVTB-18-05	-	-	36	10.2	32	13.0	24.3	13.36	25	10.4	22	11.7	25	10.1	19	25.00	26.2	13.4
IVTB-18-06	-	-	27	11.0	29	11.0	21.6	11.53	21	11.0	20	10.0	25	10.4	16	17.20	22.8	11.7
IVTB-18-07	-	-	21	14.0	30	10.5	20.6	11.26	20	12.3	21	12.5	25	10.3	19	18.20	22.4	12.7
IVTB-18-08	16	12.2	20	11.6	33	11.7	22.3	10.85	19	12.6	21	10.7	25	10.3	20	20.22	22.0	12.5
IVTB-18-09	16	12.5	27	10.7	32	16.0	21.6	10.80	19	12.5	20	10.6	25	10.7	19	23.40	22.5	13.4
IVTB-18-10	16	14.3	29	11.1	32	12.5	22.3	10.62	22	11.1	21	10.8	25	9.5	20	24.40	23.4	13.0
CD (0.05)	0.91	0.09	27		1.3	0.24	1.69	0.82	1.1	1.26	NS	0.90	NS		NS	NS		

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 2.25. The moisture percent varied from 60- 72% (Table 4.6). 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 4.6 Compost parameters for short method compost

Centres	pH	Nitrogen (%)	Moisture (%)	Colour
Pune	7.6	1.89	60	Dark brown
Pantnagar	7.5	1.86	62.5	Dark Brown
Murthal	7.7	1.8	67	Dark Brown
Ludhiana	7.1	2.2	67-69	Dark brown
Nauni	7.3	2.1	65	Dark brown
Solan	7.6	2.2	64	Dark brown
Palampur	7.6	1.8	68	Brownish-Blackish
Pusa	7.2	2.25	72	Grey



IVTB-18-08



IVTB-18-09



IVTB-18-10

Fig. 4.21. Button mushroom strain IVTB-18 at Pantnagar



Fig 4.22. IVTB-18-01 crop at Ludhiana Centre



Fig 4.23. IVTB-18-03 crop at Ludhiana Centre



Fig 4.24. IVTB-18-08 crop at Ludhiana Centre



Fig 4.25. Cross section of button mushroom strain at Ludhiana Centre



Fig 4.26. IVT crop at Murthal Centre



Fig 4.27. IVTB-18-08 crop at Pune Centre

Fig 4.28. IVTB-18-09 crop at Pune Centre

Fig 4.29. IVTB-18-10 crop at Pune Centre



Fig 4.30. IVT button mushroom crop at Pune Centre



Fig 4.31. IVT crop of button mushroom strains at Solan Centre



Fig 4.32. IVT crop of button mushroom strains at Nauni Centre



Fig 4.33. IVTB crop of button mushroom strains at Palampur Centre

1.3 Initial Varietal trial for strains of Paddy Straw Mushroom, *Volvariella volvacea*

The trial was assigned at eight centres and a total of six strains of *Volvariella volvacea* were tested. Out of nine centres only five could report successful results. At Ranchi, Vellayani and Jorhat centre, the trials was failed because of non-growth of mycelium and infection of mould. The biological efficiency of various strains varied in the range of 2.42 to 17.34 kg /100 kg of dry substrate at various centres in different strains. The maximum yield of 17.34 kg/100 kg of dry

substrate was recorded in strain Vv-18-04 at Ludhiana centre followed by Vv-18-02 strain (15.72 kg/100kg dry straw) at the same centre. It was also recorded that the all the test strains performed well with good biological efficiency at the Hiasar centre. The minimum biological efficiency of 2.42 kg/100 kg dry straw was recorded in Vv-18-06 at Ludhiana centre. Overall average showed that the maximum BE (12.72 kg) was recorded in Vv-18-02 strain while the minimum BE (8.75 kg) was in strain Vv-18-05 (Table 4.7).

Table. 4.7. Yield of different strains of Paddy Straw Mushroom, *Volvariella volvacea* (kg/100kg of dry substrate)

Strain	Coimbatore	Bhubaneswar	Ludhiana	Hisar	Raipur	Solan	Average
VV-18-01	13.17	9.01	11.70	14.6	7.46	—	11.19
VV-18-02	16.22	9.80	15.72	13.4	8.46	—	12.72
VV-18-03	—	13.49	12.56	13.0	8.62	—	11.92
VV-18-04	12.15	10.91	17.34	14.2	7.34	—	12.39
VV-18-05	—	9.72	5.82	12.4	7.06	—	8.75
VV-18-06	12.19	10.36	2.42	14.0	7.94	—	9.38
CD (0.05)	0.18	0.64	1.47	1.183	0.8	—	

Table 4.8. Average fruit body weight (g) and time taken to first harvest in strains of paddy straw mushroom

Strains	Coimbatore		Bhubaneswar		Ludhiana		Hisar		Raipur		Solan		Average	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b
VV-18-01	14.2	30.3	15.33	17.38	11.0	10	14.8	20.6	11.1	18.6	—	—	13.3	19.4
VV-18-02	14.3	32.3	14.83	17.26	11.5	10	15.0	20.8	11.6	18.6	—	—	13.4	19.8
VV-18-03	—	—	13.61	21.20	10.5	11	15.2	19.6	9.1	19.0	—	—	12.1	17.7
VV-18-04	15.1	30.0	15.56	20.77	11.8	9	14.6	20.0	6.9	18.4	—	—	12.8	19.6
VV-18-05	—	—	15.56	18.79	9.1	16	13.6	21.6	10.1	21.0	—	—	12.1	19.3
VV-18-06	14.8	29.2	14.78	18.76	10.0	22	13.2	20.6	10.5	17.8	—	—	12.7	21.7
CD (0.05)	0.30	0.18	0.28	1.53	0.22	0.62	1.43	0.89	0.36	0.70	—	—		

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

The minimum time taken for the first harvest was 6.9 days in strain Vv-18-04 at Raipur centre. The overall average indicated the minimum time taken for the first harvest was in strain Vv-18-03 and Vv-18-05 while the maximum time in strain Vv 18-02 (Table 4.8).

The average fruit body weight varied at different centres with a maximum of 32.3 g at

Coimbatore centre in the strain Vv-18-02 while the minimum fruit body weight was recorded to be 9.0 g at Ludhiana centre in the strain Vv-18-04. All the strains have recorded the maximum fruit body weight at Coimbatore centre followed by Hisar centre. Overall average showed that the maximum fruit body weight (21.7 g) was recorded in strain Vv-18-06 while minimum (17.7 g) in Vv-18-03 strain (Table 4.8).



Fig. 4.34. Paddy straw mushroom IVT Trials at Coimbatore Centre



VV-18-01



VV-18-02



VV-18-04

Fig. 4.35. Paddy straw mushroom IVT Trials at Bhubaneshwar Centre



VV-18-02



VV-18-03



VV-18-04

Fig. 4.36. Paddy straw mushroom IVT Trials and cross section of fruit bodies at Ludhiana Centre

1.4 Initial varietal trial-18 of high yielding varieties/strains of Oyster Mushroom (*Pleurotus* spp)
On wheat straw

This trial was conducted at 27 different centres. A total of ten high yielding strains of *Pleurotus* species were under evaluation (Table 4.9). All the strains have to be evaluated on wheat and paddy straw separately, whichever is

available in the area. The experiment had 3 replications of 10 bags of 5 kg wet straw each. A total 11 centres have used wheat straw as substrate.

All the strains under testing gave maximum biological efficiency at Pune centre with a maximum BE of 109.02 kg/100 kg of dry straw. However, the minimum BE was recorded to be 4% at Palampur centre in PI-18-09 strain. All the strains performed below average production at

Table 4.9. Strain evaluation of oyster mushroom species (yield kg/100kg dry substrate) on wheat straw

Location	Strains										CD (0.05)
	PL-18-01	PL-18-02	PL-18-03	PL-18-04	PL-18-05	PL-18-06	PL-18-07	PL-18-08	PL-18-09	PL-18-10	
Almora	79.83	—	50.42	40.15	52.43	65.95	81.38	58.02	45.00	69.83	2.4
Hisar	37.40	67.60	36.60	73.60	40.40	29.60	68.40	46.40	37.60	30.60	0.676
Jammu	62.83	71.76	51.20	59.66	57.26	49.93	74.33	70.16	63.76	55.63	3.01
Meerut	52.50	61.90	73.30	78.20	80.00	71.70	63.40	61.20	53.00	54.00	5.78
Palampur	0.00	21.50	0.00	31.90	27.20	25.50	30.60	27.80	4.00	0.00	3.1
Pantnagar	30.86	85.47	30.31	60.14	72.09	61.26	83.81	46.21	66.51	49.26	0.2
Pune	83.64	70.75	79.42	83.58	97.86	91.66	66.43	77.00	75.66	109.02	2.35
Raipur	47.71	41.96	52.39	47.68	50.37	38.12	46.42	47.71	41.96	52.39	1.32
Samastipur	72.10	62.14	69.14	60.33	74.00	68.66	73.33	58.27	60.63	59.27	3.42
Srinagar	36.89	49.19	39.65	38.02	0.00	43.64	26.87	48.34	43.41	35.65	2.59
Udaipur	63.57	60.73	71.47	79.67	46.65	54.77	45.81	81.72	—	—	—
Average	51.58	59.30	50.35	59.36	54.39	54.62	60.07	56.62	49.15	51.57	

Table 4.10. Time taken for first harvest in different strains of *Pleurotus* (in days) on wheat straw

Location	Strains										CD (0.05)
	PL-18-01	PL-18-02	PL-18-03	PL-18-04	PL-18-05	PL-18-06	PL-18-07	PL-18-08	PL-18-09	PL-18-10	
Almora	40.00	42.00	30.00	27.00	28.00	28.00	26.00	27.00	28.00	27.00	—
Hisar	32.40	24.80	31.80	25.20	25.40	33.40	26.40	31.60	33.40	30.60	0.686
Jammu	30.53	30.36	30.76	31.16	30.43	30.76	30.36	29.13	30.13	30.60	1.11
Meerut	29.60	27.00	30.00	27.30	31.00	30.10	30.00	33.00	29.00	28.00	3.15
Palampur	0.00	81.00	0.00	65.00	83.00	65.00	65.00	65.00	65.00	0.00	0
Pantnagar	21.00	32.00	20.00	26.00	17.00	19.00	16.00	32.00	25.00	28.00	3.88
Pune	23.93	24.83	25.77	25.33	23.00	24.67	27.33	25.17	28.00	25.33	2.47
Raipur	32.60	32.80	32.20	31.80	32.20	31.90	31.40	32.60	32.80	32.20	NS
Samastipur	26.00	24.00	25.00	27.00	25.00	25.00	23.00	22.00	26.00	20.00	NS
Srinagar	38.45	37.52	42.23	40.06	-	42.07	42.95	39.18	42.00	40.65	-
Udaipur	29.00	33.00	38.00	30.00	32.00	28.00	43.00	40.00	—	—	—
Average	27.59	35.39	27.80	32.35	32.70	32.54	32.86	34.24	33.93	26.24	

Palampur centre. Overall average showed maximum average BE of 60.07 kg/100 kg straw in PL-18-07 strain.

The minimum time taken for the first harvest was recorded as 16 days at Pantnagar centre in PL-18-07 strain while maximum first harvest time



Table 4.11. Average fruit body weight in different strains of *Pleurotus* (in g) on wheat straw

Location	Strains										CD (0.05)
	PL-18-01	PL-18-02	PL-18-03	PL-18-04	PL-18-05	PL-18-06	PL-18-07	PL-18-08	PL-18-09	PL-18-10	
Almora	5.81	8.22	3.83	8.09	3.57	4.92	5.56	6.91	7.23	7.44	2.6
Hisar	21.40	26.70	23.80	27.60	21.80	25.80	29.80	23.80	—	—	1.34
Jammu	15.72	17.70	12.39	15.18	15.01	13.43	15.58	12.39	15.18	14.64	0.1
Meerut	24.00	18.00	26.00	28.00	26.00	27.00	24.00	21.00	24.00	20.00	5.31
Palampur	0.00	12.80	0.00	13.50	24.40	11.10	13.30	13.30	13.70	0.00	
Pantnagar	10.68	16.60	12.54	15.67	18.10	20.66	30.64	12.54	15.67	16.62	0.2
Pune	3.97	7.46	3.55	5.68	4.59	4.37	5.22	6.68	6.38	5.10	1.51
Samastipur	5.70	10.15	11.20	12.50	13.35	15.20	10.50	9.25	8.75	7.33	NS
Srinagar	12.40	16.33	19.81	22.36	-	12.08	17.98	15.70	12.86	21.06	—
Udaipur	6.21	6.31	6.62	7.18	5.67	6.06	7.11	6.56	—	—	—
Average	10.59	14.03	11.97	15.58	14.72	14.06	15.97	12.81	12.97	11.52	

of more than 83 days was recorded at Palampur centre in PL-18-05 strain. Maximum first harvest time was recorded at Palampur centre in all the strains tested (Table 4.10). Maximum fruit body

weight of 29.8 g was recorded in strain PL-18-07 at Hisar centre while the lowest Fruit body weight of 3.55 g at Pune centre in PL-18-03 strain (Table 4.11).



Fig. 4.37. Crop at Almora centre



Fig. 4.38. Crop at Jammu centre



Fig. 4.39. Crop at Palampur centre



Fig. 4.40. Crop at Pantnagar centre



Fig. 4.41. Crop at Pune centre



Fig. 4.42. Crop at Srinagar centre



Fig. 4.43. Crop at Udaipur centre

On Paddy straw

A total 13 centres have used paddy straw as substrate. All the strains under testing gave maximum biological efficiency at Sikkim centre with a maximum BE of 133.5 kg/100 kg of dry straw in PL-18-03 strain followed by Coimbatore centre. However, the minimum BE was recorded to be 1.5% at Banglore centre in PL-18-03 strain. All the strains performed below average production at Banglore centre. Overall average showed maximum average BE of 62.52 kg/100 kg straw in PL-18-04 strain (Table 4.12).

The minimum time taken for the first harvest was recorded as 8.58 days at Manipur centre in PL-18-10 strain while maximum first harvest time of more than 45 days was recorded at Almora centre in PL-18-04 and PL-18-09 strain. Maximum first harvest time was recorded at Almora centre in all the strains tested (Table 4.13). Maximum fruit body weight of 47 g was recorded in strain PL-18-04 and PL-18-09 at Pasighat centre while the lowest Fruit body weight of 2.63 g at Pune centre in PL-18-01 strain (Table 4.14).



Table 4.12. Strain evaluation of oyster mushroom species (yield kg/100kg dry substrate) on Paddy straw

Location	Strains										CD (0.05)
	PL-18 -01	PL-18 -02	PL-18 -03	PL-18 -04	PL-18 -05	PL-18 -06	PL-18 -07	PL-18 -08	PL-18 -09	PL-18 -10	
Bangalore	18.91	35.64	1.50	27.86	31.23	8.26	23.01	17.44	10.84	42.43	0.14
Barapani	57.00	58.00	32.40	67.00	47.30	54.60	49.80	51.60	52.80	36.50	1.64
Bhubaneswar	40.46	34.10	46.95	55.19	54.21	65.75	36.23	33.99	61.59	31.11	4.18
Coimbatore	94.65	101.78	110.88	99.58	109.79	95.41	114.35	103.58	101.58	102.28	11.26
Jammu	60.86	70.13	53.56	60.70	61.13	51.53	72.33	71.46	65.26	57.80	3.48
Kalyani	35.15	30.65	27.25	40.25	45.90	27.66	35.83	33.47	39.08	40.65	0.76
Manipur	48.43	68.05	39.35	104.59	87.82	77.84	96.54	51.50	49.47	47.09	0.18
Meerut	51.00	52.00	64.00	66.00	68.00	64.00	66.00	66.00	56.00	50.00	7.8
Mizoram	15.79	13.36	14.02	13.99	14.08	14.81	18.69	15.39	14.31	15.56	0.75
Pasighat	30.16	30.78	40.01	42.35	46.71	39.28	52.27	45.60	50.11	64.36	0.23
Pune	70.44	86.06	72.78	81.12	85.87	61.78	79.54	62.33	74.32	77.33	1.56
Sikkim	107.44	104.10	133.50	125.40	108.30	77.26	74.70	125.90	117.82	99.20	0.13
Vellayani	56.25	36.70	25.26	28.70	49.40	42.14	28.20	79.08	33.96	78.77	5.883
Average	52.81	55.49	50.88	62.52	62.29	52.33	57.50	58.26	55.93	57.16	

Table 4.13. Time taken for first harvest in different strains of *Pleurotus* (in days) on Paddy straw

Location	Strains										CD (0.05)
	PL-18 -01	PL-18 -02	PL-18 -03	PL-18 -04	PL-18 -05	PL-18 -06	PL-18 -07	PL-18 -08	PL-18 -09	PL-18 -10	
Almora	44.00	44.00	44.00	45.00	33.00	37.00	27.00	37.00	45.00	37.00	1.2
Barapani	36.00	37.00	38.00	35.00	37.00	36.00	33.00	34.00	35.00	36.00	0.9
Bhubaneswar	31.74	31.35	42.98	28.16	28.29	30.97	45.19	45.11	38.22	47.81	1.001
Coimbatore	19.66	20.23	21.76	22.73	20.83	21.60	22.60	23.00	20.13	23.90	1.3
Jammu	29.86	31.10	30.90	31.16	30.86	31.10	31.00	30.43	30.80	30.53	1.21
Kalyani	17.67	17.87	18.30	18.27	17.93	18.23	17.93	18.23	18.03	17.67	NA
Manipur	9.25	16.67	9.73	16.63	12.74	15.23	16.56	13.01	10.34	8.58	0.18
Meerut	30.00	32.00	33.00	28.00	28.00	30.00	35.00	26.00	28.00	30.00	4.85
Mizoram	28.10	28.17	28.17	27.47	28.00	27.90	27.67	28.20	28.40	28.00	0.075
Pasighat	31.00	34.00	36.00	37.00	40.00	38.00	38.00	37.00	40.00	37.00	0.86
Pune	23.67	24.33	25.00	26.00	23.00	25.67	26.33	28.00	28.67	26.67	2.33
Sikkim	27.36	27.43	27.36	27.16	27.36	27.23	27.46	27.40	27.40	27.70	0.67
Vellayani	22.63	21.53	22.70	25.87	22.20	22.13	22.10	22.70	24.53	21.13	1.115
Average	27.00	28.13	29.07	28.34	26.86	27.77	28.45	28.47	28.81	28.61	

Table 4.14. Average fruit body weight in different strains of *Pleurotus* (in g) on Paddy straw

Location	Strains										CD (0.05)
	PL-18-01	PL-18-02	PL-18-03	PL-18-04	PL-18-05	PL-18-06	PL-18-07	PL-18-08	PL-18-09	PL-18-10	
Barapani	9.50	10.20	7.80	9.10	9.50	8.70	7.00	8.10	8.60	7.90	NS
Bhubaneswar	3.25	5.01	3.82	4.54	4.58	3.99	2.61	3.34	5.09	4.57	0.287
Coimbatore	11.49	13.27	14.26	12.62	13.77	12.25	14.06	12.85	12.58	12.34	1.08
Jammu	15.23	17.29	12.99	15.44	16.45	13.52	15.00	12.99	15.44	15.70	0.69
Kalyani	8.51	10.41	7.06	8.30	15.62	2.78	10.11	9.67	8.70	9.06	NA
Manipur	32.90	32.80	34.50	28.00	31.60	27.70	31.80	33.10	33.30	34.40	0.67
Meerut	26.00	23.00	32.00	30.00	26.00	26.00	21.00	22.00	24.00	26.00	6.41
Mizoram	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
Pasighat	43.00	38.00	44.00	47.00	44.00	40.00	43.00	44.00	47.00	44.00	0.5
Pune	2.63	4.33	3.77	3.97	4.23	4.67	4.30	4.20	4.10	5.03	0.48
Sikkim	3.97	3.87	4.08	4.15	3.95	3.70	3.08	4.08	4.15	3.89	0.011
Vellayani	12.15	7.03	7.58	7.88	6.25	9.17	7.48	7.10	4.04	7.77	1.602
Average	14.69	14.40	14.96	14.88	15.30	13.34	13.92	14.09	14.55	14.86	



Fig. 4.44. Crop at Bangalore centre



Fig. 4.45. Crop at Barapani centre

Fig. 4.46. Crop at Bhubaneswar centre



Fig. 4.47. Crop at Bhubaneswar centre



Fig. 4.48. Crop at Coimbatore centre



Fig. 4.49. Crop at Jammu centre



Fig. 4.50. Crop at Kalyani centre



Fig. 4.51. Crop at Manipur centre



Fig. 4.52. Crop at Vellayani centre



Fig. 4.53. Crop at Mizoram centre



Fig. 4.54. Crop at Pasighat centre



Fig. 4.55. Crop at Pune centre



Fig. 4.56. Crop at Vellayani centre



Fig. 4.57. Crop at Sikkim centre

1.5 Advance varietal trial-1 for high yielding strains of Milky mushroom (*Calocybe indica*)

On wheat straw

This trial was allotted to fourteen different Centres and six strains of milky mushroom were to be evaluated on wheat and paddy straw based on availability of the substrate. Seven centres have done this experiment on wheat straw based substrate. Amongst these centres, the maximum yield of 101.77 kg/ 100 kg straw was obtained at the Udaipur centre in CI-18-06 strain followed by CI-18-05 strain (86.38 kg/100 kg straw) at the same centre. Minimum yield of 16.23 kg/ 100 kg straw was obtained in CI-18-06 strain at Raipur centre. None of the strains performed up to the

mark at Raipur centre. Overall average showed that CI-18-03 performed the best amongst the strains tested with overall average of 60.73 kg per 100 kg dry substrate (Table 4.15).

The minimum days taken for first harvest (29.50 days) was observed in the strain CI-18-02 and CI-18-01 at Murthal centre while maximum days taken for first harvest (53.10 days) in strain CI-18-01 at Raipur Centre. Overall average showed that the minimum time taken for first harvest was in strain CI-18-06 while maximum time taken in the strain CI-18-01 (Table 4.16). The maximum fruitbody weight (145.42 g) was observed in strain CI-18-06 at Udaipur centre while a minimum fruit body weight of 27.54 g was recorded in CI-18-05 strain at Udaipur centre (Table 4.17).

Table 4.15. Initial varietal trail for high yielding strains of milky mushroom (kg/100 kg dry sub) on wheat straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Samastipur	50.97	56.63	51.37	65.11	43.80	43.73	3.56
Jammu	46.22	46.53	44.10	53.62	46.71	45.92	0.43
Ludhiana	20.20	30.40	57.30	48.50	32.30	45.70	3.20
Udaipur	—	67.80	77.00	72.78	86.38	101.77	
Raipur	16.59	17.17	—	20.33	17.91	16.23	1.03
Meerut	66.50	56.25	50.50	57.50	60.00	50.00	2.11
Murthal	72.16	59.72	84.13	75.20	67.22	74.01	3.99
Average	45.44	47.79	60.73	56.15	50.62	53.91	

Table 4.16. Day taken to first harvest on wheat straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Samastipur	38.00	37.00	37.00	38.00	40.00	39.00	1.26
Jammu	36.95	36.49	37.99	37.66	37.62	38.28	2.12
Ludhiana	49.00	49.00	40.00	43.00	43.00	46.00	2.02
Udaipur	—	44.00	42.00	44.00	44.00	36.00	—
Raipur	53.10	52.50	52.80	52.87	52.27	52.27	1.45
Meerut	42.10	40.70	40.60	38.90	38.80	36.00	1.81
Murthal	29.70	29.50	34.40	32.50	31.90	33.10	1.30
Average	41.48	41.31	40.68	40.99	41.08	40.09	

Table 4.17. Average fruit body weight on wheat straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Samastipur	40.60	70.30	50.33	42.35	35.36	42.50	1.34
Jammu	78.98	76.73	70.94	88.61	73.44	74.59	3.84
Ludhiana	51.50	35.60	42.50	38.30	43.50	51.40	1.42
Udaipur	—	60.25	57.08	32.43	27.54	145.42	1.22
Meerut	41.90	46.00	42.40	40.10	42.00	41.60	1.39
Murthal	42.69	42.56	40.37	40.37	43.40	39.88	1.42
Average	51.13	55.24	50.60	47.03	44.21	65.90	



Fig. 4.58. Strain evaluation trial of milky mushroom at Samastipur centre



Fig. 4.59. Milky mushroom trial at Ludhiana centre



Fig. 4.60. Milky mushroom trial at Udaipur centre



Fig. 4.61. Milky mushroom trial at Murthal centre

On paddy straw

Five centres have done this experiment on Paddy straw based substrate based on availability of the substrate. Amongst these centres, the maximum yield of 134.26 kg/ 100 kg straw was obtained at the Coimbatore centre in CI-18-06 strain followed by CI-18-03 strain (129.90 kg/100 kg straw) at the same centre. Minimum yield of 7.15 kg/ 100 kg straw was obtained in CI-18-03 strain at Vellayani centre. None of the strains performed up to the mark at Vellayani centre.

Overall average showed that CI-18-04 performed the best amongst the strains tested with overall average of 57.00 kg per 100 kg dry substrate (Table 4.18).

The minimum days taken for first harvest (27.69 days) was observed in the strain CI-18-01 followed by CI-18-06 at Cimbatore centre while maximum days taken for first harvest (45.73 days) in strain CI-18-02 at Bhubaneshwar Centre. Overall average showed that the minimum time taken for first harvest was in strain CI-18-04 while

Table 4.18. Initial varietal trail for high yielding strains of milky mushroom (kg/100 kg dry sub) on Paddy straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Coimbatore	94.51	65.59	129.90	94.79	90.79	134.26	18.32
Vellayani	21.69	8.99	7.15	38.34	13.50	7.26	5.48
Jammu	40.82	40.64	40.11	49.70	40.07	40.57	0.47
Meerut	61.00	59.00	50.50	51.15	48.00	45.00	3.22
Bhubaneshwar	44.50	49.17	51.33	51.00	53.00	56.83	2.80
Average	52.50	44.68	55.80	57.00	49.07	56.78	

Table 4.19. Day taken to first harvest on Paddy straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Coimbatore	27.69	30.63	29.53	30.03	31.16	29.33	0.69
Vellayani	32.77	33.53	33.74	31.14	34.53	34.84	1.37
Jammu	39.99	39.83	38.24	40.41	40.74	41.08	NS
Meerut	43.77	44.25	43.75	39.75	45.25	38.25	4.20
Bhubaneshwar	44.00	45.73	43.87	45.13	42.13	45.43	0.76
Average	37.64	38.79	37.83	37.29	38.76	37.79	

Table 4.20. Average fruit body weight on Paddy straw

Centres	Strains						CD (0.05)
	CI-18-01	CI-18-02	CI-18-03	CI-18-04	CI-18-05	CI-18-06	
Coimbatore	33.43	33.00	32.94	31.98	31.29	29.27	2.70
Vellayani	48.70	32.45	32.35	102.40	39.10	30.05	13.91
Jammu	39.99	39.83	38.24	40.41	40.74	41.08	NS
Meerut	40.00	37.60	35.75	33.40	33.80	36.75	3.30
Bhubaneshwar	72.91	105.50	87.26	98.97	103.82	94.97	7.90
Average	47.01	49.68	45.31	61.43	49.75	46.42	

maximum time taken in the strain CI-18-02 (Table 4.19). The maximum fruitbody weight (105.50 g) was observed in strain CI-18-02 at Bhubaneshwar

centre while a minimum fruit body weight of 29.27 g was recorded in CI-18-06 strain at Coimbatore centre (Table 4.20).



Fig. 4.62. Strain evaluation trial of milky mushroom at Coimbatore centre



Fig. 4.63. Milky mushroom trial at Vellayani centre



Fig. 4.64. Milky mushroom trial at Bhubaneshwar centre



1.6 Advance Varietal trial-2 of Shiitake mushroom

This trial was allotted to sixteen different centres and ten strains of shiitake mushroom (LE-18-01 to LE-18-10) were to be evaluated. The evaluation was to be done on two substrates i.e. saw dust and wheat straw whatever is available easily. A total of five centres have reported successful results of the experiment. At rest of the eleven centres the experiment is ongoing and results could not be reported. The maximum

biological efficiency of 149.00 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in LE-18-05 followed by 139.52 kg / 100 kg saw dust in the strain LE-18-01 at the same centre. Lowest BE was of 12.82 kg / 100 kg of dry substrate was recorded at Nauni centre in the strain LE-18-05 on substrate. The lowest and highest yield both was recorded in LE-18-05 itself at different centres. Overall average biological efficiency showed that the strain LE-18-06 performed the best (Table 4.21).

Table 4.21. Initial varietal trail for shiitake mushroom (kg/100 kg dry sub)

Centres	Strains										CD (0.05)
	LE-18-01	LE-18-02	LE-18-03	LE-18-04	LE-18-05	LE-18-06	LE-18-07	LE-18-08	LE-18-09	LE-18-10	
Murthal (sd)	139.52	125.97	137.36	118.31	149.00	142.16	127.88	136.4	137.84	130.53	10.28
Pantnagar (ws)	-	-	-	-	60.52	-	-	-	64.02		0.18
Nauni (Sd)	20.79	15.93	14.76	19.04	12.82	14.72	28.81	16.51	21.39	35.54	7.88
Jammu (Sd)	37.79	50.61	38.39	36.83	37.89	61.56	38.22	38.39	37.89	36.17	16.18
Jammu (ws)	90.50	102.28	90.89	90.28	90.44	94.94	91.44	88.89	90.72	90.72	5.03
Meerut (Sd)	36.20	27.00	27.20	30.70	22.50	—	—	—	—	—	3.87
Meerut (ws)	40.00	20.00	14.00	46.00	20.50	—	—	—	—	—	3.01
Average	60.80	56.97	53.77	56.86	56.24	78.35	71.59	70.05	70.37	73.24	

Table 4.22. Day taken to first in high yielding strains of shiitake mushroom

Centres	Strains										CD (0.05)
	LE-18-01	LE-18-02	LE-18-03	LE-18-04	LE-18-05	LE-18-06	LE-18-07	LE-18-08	LE-18-09	LE-18-10	
Murthal (sd)	76.57	79.60	86.90	79.40	79.30	82.27	80.03	80.60	77.80	79.17	2.49
Pantnagar (ws)	—	—	—	—	70.56	—	—	59.13	—	—	—
Nauni (Sd)	78.00	78.00	75.00	74.00	74.00	74.00	72.00	74.00	74.00	70.80	0.72
Jammu (Sd)	167.00	154.20	166.9	168.60	167.90	153.40	168.10	166.00	168.60	135.40	30.8
Jammu (ws)	113.40	113.90	113.4	113.80	114.30	114.00	113.60	113.60	113.50	113.40	0.97
Meerut (Sd)	91.00	90.50	80.20	79.20	81.70	—	—	—	—	—	4.50
Meerut (ws)	90.00	95.20	86.50	78.00	83.00	—	—	—	—	—	1.60
Average	102.66	101.90	101.48	98.83	95.82	105.92	108.43	98.67	108.48	99.69	

It was observed that the maximum time taken to first harvest was 168.60 days in LE-18-04 and LE-18-09 at Jammu centre while minimum first

harvest time of 70.80 days in saw dust substrate was recorded in strain LE-18-10 at Nauni centre (Table 4.22 and Table 4.23).

Table 4.23. Average fruit body wt in high yielding strains of shiitake mushroom

Centres	Strains										CD (0.05)
	LE-18-01	LE-18-02	LE-18-03	LE-18-04	LE-18-05	LE-18-06	LE-18-07	LE-18-08	LE-18-09	LE-18-10	
Murthal (sd)	32.08	36.91	36.00	41.06	32.88	35.03	36.48	34.85	36.41	40.77	2.12
Pantnagar (ws)	—	—	—	—	27.90	—	—	24.41	—	—	0.41
Nauni (Sd)	17.18	14.38	13.50	17.46	9.96	11.79	19.56	13.21	17.86	21.12	1.26
Jammu (Sd)	11.55	16.11	12.03	11.45	11.86	19.24	11.86	12.06	11.69	11.00	1.46
Jammu (ws)	22.49	25.34	22.46	22.87	22.84	23.34	22.04	22.18	22.36	21.59	1.42
Meerut (Sd)	18.70	10.50	9.20	8.50	7.70	—	—	—	—	—	2.61
Meerut (ws)	18.70	10.20	8.20	7.70	7.50	—	—	—	—	—	5.00
Average	20.12	18.91	16.90	18.17	17.23	22.35	22.49	21.34	22.08	23.62	



Fig. 4.65. Crop of Shiitake in Murthal



Fig. 4.66. Crop of Shiitake at Nauni centre



Fig. 4.67. Crop of Shiitake at Pantnagar centre



1.7 Initial varietal trial- 18 of Lions Maine Mushroom *Hericium erinaceus*

This trial was allotted to eleven different centres and nine strains of *Hericium erinaceus* mushroom (IVTH-18-01 to IVTH-18-09) were to be evaluated. The evaluation was to be done on two substrates i.e. saw dust and wheat straw whatever is available easily. A total of six centres have reported successful results of the experiment. Pantnagar and Hisar centres have done this experiment on wheat straw and saw

dust based substrate both. The maximum biological efficiency of 208.52 kg / 100 kg of dry substrate was obtained at Murthal centre on saw dust based substrate in IVTH-18-06 followed by 180.35 kg / 100 kg saw dust substrate in the strain IVTH-18-05 at the same centre. Lowest BE was of 8.80 kg / 100 kg of dry substrate was recorded at Nauni centre in the strain IVTH-18-05 on saw dust substrate. The lowest and highest yield both was recorded in IVTH-18-05 itself at different centres. Overall average biological efficiency showed that

Table 4.24. Initial varietal trail for *Hericium* mushroom (kg/100 kg dry sub)

Centres	Strains									CD (0.05)
	IVTH-18-01	IVTH-18-02	IVTH-18-03	IVTH-18-04	IVTH-18-05	IVTH-18-06	IVTH-18-07	IVTH-18-08	IVTH-18-09	
Pusa (sd)	10.00	21.50	13.00	28.00	10.00	27.00	15.00	30.00	32.50	0.98
Nauni (sd)	21.79	9.85	—	18.46	8.80	—	10.75	20.11	—	2.12
Raipur (sd)	19.69	—	12.42	16.65	17.92	10.07	16.61	23.56	19.24	2.03
Pantnagar (sd)	21.02	—	—	—	—	—	—	—	—	—
Pantnagar (ws)	31.72	-	25.28	24.91	9.02	41.28	22.28	39.08	9.28	2.03
Hisar (sd)	20.50	18.50	19.30	17.50	17.20	15.10	17.70	23.70	12.70	0.51
Hisar (ws)	18.00	16.10	15.50	15.10	16.10	13.10	12.70	18.70	14.70	0.60
Murthal (sd)	166.52	174.44	147.06	157.66	180.35	208.52	172.51	160.66	170.69	2.03
Average	38.66	40.07	38.76	39.75	37.06	52.51	38.22	45.12	43.19	

Table 4.25. Day taken to first in high yielding strains of *Hericium* mushroom

Centres	Strains									CD (0.05)
	IVTH-18-01	IVTH-18-02	IVTH-18-03	IVTH-18-04	IVTH-18-05	IVTH-18-06	IVTH-18-07	IVTH-18-08	IVTH-18-09	
Pusa (sd)	36.00	36.00	40.00	35.00	40.00	36.00	43.00	30.00	38.00	2.26
Nauni (sd)	61.00	69.00	—	61.00	69.00	—	61.00	61.00	—	
Raipur (sd)	51.30	—	60.80	54.20	62.40	63.70	61.00	59.90	60.40	1.77
Pantnagar (sd)	67.16	—	—	—	—	—	—	—	—	—
Pantnagar (ws)	44.00	—	53.00	52.00	49.00	49.00	47.00	49.00	41.00	7.31
Hisar (sd)	30.60	37.60	36.60	36.60	31.60	32.60	32.60	29.40	29.40	0.49
Hisar (ws)	33.80	39.60	35.60	38.60	31.40	31.20	34.60	33.60	34.40	0.65
Murthal (sd)	58.50	59.40	59.80	60.30	56.80	62.80	59.40	57.60	59.10	1.71
Average	47.80	40.27	47.63	48.24	48.60	45.88	48.37	45.79	43.72	



Fig. 4.68. Crop of Hericium at Samastipur centre



Fig. 4.69. Crop of Hericium at Nauni centre



Fig. 4.70. Crop of Hericium at Pantnagar centre

the strain IVTH-18-06 performed the best (Table 4.24).

It was observed that the maximum time taken to first harvest was 69.00 days in IVTH-18-02 and IVTH-18-05 at Nauni centre while minimum first harvest time of 29.40 days in saw dust substrate was recorded in strain IVTH-18-08 and IVTH-18-09 at Hisar centre (Table 4.25).

2. CROP PRODUCTION

2.1 Second Yield trials for identification of Pleurotus species suitable for different parts of country

On wheat straw

This trial was assigned to 26 different centres to be conducted on wheat or paddy straw



whichever is available. A total of eight high yielding strains of *Pleurotus* species were under evaluation trial (Table 4.14). A total of eleven centres have conducted this experiment on wheat straw. The experiment was conducted to identify the strains/species of *Pleurotus* for cultivation in different agro-climatic regions. It was observed

from the experiment that in P-18-02 has performed the best amongst all the strains tested at Udaipur centre. Minimum yield was recorded at Palampur centre in strain P-18-02 itself. Overall average showed P-18-03 performed best at all the centre with an average yield of 62.06 kg/ 100 kg of wheat straw (Table 4.26).

Table 4.26. Strain evaluation of oyster mushroom species (yield kg/100kg dry substrate) on wheat straw

Location	Strains								
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	CD (5%)
Pune	78.61	80.54	63.03	57.22	70.03	50.89	56.08	82.96	1.78
Raipur	62.60	60.70	59.93	69.22	61.23	54.38	62.87	—	1.76
Samastipur	74.60	73.14	82.70	80.60	78.50	70.40	64.21	61.00	2.78
Pantnagar	31.49	26.68	50.98	25.81	29.31	27.58	19.15	34.97	0.18
Ranchi	66.56	59.83	69.40	68.06	69.33	63.83	69.86	62.56	0.78
Udaipur	65.00	96.00	-	77.00	68.00	-	66.00	58.00	0.49
Meerut	58.60	48.30	62.30	56.60	58.60	62.30	53.60	56.60	7.20
Hisar	49.40	52.40	47.60	55.20	43.60	51.60	59.60	47.60	0.77
Srinagar	29.39	50.46	46.32	32.25	42.16	48.78	34.11	53.43	3.73
Jammu	61.16	67.20	57.16	57.60	63.73	65.20	67.43	71.06	3.48
Palampur	26.10	22.80	81.20	26.00	29.20	53.80	78.90	32.80	3.50
Average	54.86	58.00	62.06	55.05	55.79	54.88	57.44	56.10	

Table 4.27. Time taken for first harvest in different strains of *Pleurotus* (in days) on wheat straw

Location	Strains								
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	CD (5%)
Pune	25.13	28.70	24.40	25.03	24.27	26.17	27.20	25.27	0.79
Raipur	62.60	60.70	59.93	69.22	61.23	54.38	62.87	—	1.05
Samastipur	28.00	26.00	29.00	25.00	24.00	25.00	24.00	25.00	NS
Pantnagar	26.00	48.00	23.00	32.00	36.00	27.00	16.00	32.00	5.28
Ranchi	17.27	17.53	18.10	17.93	17.23	17.43	17.66	17.67	0.36
Udaipur	36.00	34.00	-	43.00	32.00	-	34.00	37.00	
Meerut	26.60	24.30	26.60	23.00	22.30	21.30	25.00	24.00	3.43
Hisar	27.00	19.40	23.60	21.80	30.60	21.60	16.60	19.40	0.80
Srinagar	32.89	22.98	28.70	30.94	42.49	33.71	47.01	41.35	
Jammu	29.80	29.73	30.20	30.00	30.13	30.06	30.26	30.46	0.38
Palampur	51.00	43.00	43.00	129.00	24.00	29.00	17.00	43.00	51.00
Average	32.94	32.21	30.65	40.63	31.30	28.57	28.87	29.52	

Table 4.28. Average fruit body weight in different strains of *Pleurotus* (in g) on wheat straw

Location	Strains								
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	CD (5%)
Pune	5.0	6.0	5.3	5.1	9.4	5.4	3.1	8.4	1.8
Samastipur	22.0	27.0	30.0	28.0	17.0	15.0	19.0	24.0	NS
Pantnagar	10.6	22.4	10.4	15.2	21.2	4.6	15.6	10.0	-
Ranchi	8.6	7.3	9.6	9.0	9.4	8.1	9.3	7.8	0.4
Udaipur	7.7	7.4	-	7.6	8.1	-	5.8	5.8	—
Meerut	38.3	35.3	42.6	38.3	40.3	34.0	36.0	32.0	6.0
Hisar	21.4	26.7	23.8	27.6	21.8	25.8	29.8	23.8	1.4
Srinagar	29.9	15.7	13.9	11.2	18.4	15.2	12.1	8.0	
Jammu	15.9	16.9	13.5	14.5	15.4	14.4	17.2	17.4	0.1
Palampur	13.7	10.3	30.0	13.4	12.1	11.9	8.8	10.1	13.7
Average	17.3	17.5	19.9	17.0	17.3	14.9	15.7	14.7	



Fig. 4.71. Crop at Pune centre



Fig. 4.72. Crop at Pantnagar centre



Fig. 4.73. Crop at Ranchi centre



Fig. 4.74. Crop at Udaipur centre



Fig. 4.75. Crop at Srinagar centre



Fig. 4.76. Crop at Palampur centre

The first harvest time was differed in different strain at different centres (Table. 4.27). The minimum time taken for the first harvest was recorded as 16 days at Pantnagar centre in P-18-07 strain while maximum first harvest time of 129 days was recorded at Palampur centre in P-18-04 strain. The least first harvest time in all the strains was recorded at Ranchi centre. Maximum fruit body weight of 42.6 g was recorded in strain P18-03 at Meerut centre while the lowest Fruit body weight of 3.1 g at Pune centre in P18-07 strain (Table 4.28).

On paddy straw

This trial was assigned to 26 different centres to be conducted on wheat or paddy straw whichever is available. A total of eight high yielding strains of *Pleurotus* species were under evaluation trial (Table 4.29). A total of thirteen centres have conducted this experiment on Paddy straw. The experiment was conducted to identify the strains/species of *Pleurotus* for cultivation in different agro-climatic regions. It was observed from the experiment that P-18-01 performed the best amongst all the strains tested at Coimbatore

Table 4.29. Strain evaluation of oyster mushroom species (yield kg/100kg dry substrate) on paddy straw

Location	Strains								CD (5%)
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	
Pune	57.92	60.70	57.74	49.14	66.72	44.81	44.31	83.27	12.92
Pasighat	27.23	28.40	—	33.51	51.93	30.00	31.03	60.33	0.02
Vellayani	20.89	15.97	25.27	22.42	53.77	70.92	48.95	78.15	6.68
Coimbatore	127.27	102.17	118.73	98.42	104.51	105.37	95.85	99.92	8.90
Bhubaneswar	31.67	34.00	65.92	26.42	34.17	0.00	55.83	34.50	3.48
Meerut	53.60	45.60	54.00	52.30	50.00	54.30	56.00	50.00	3.96
Manipur	80.84	90.91	46.65	95.58	87.62	81.15	114.66	75.23	0.08
Kalyani	43.42	39.86	36.90	37.44	32.54	36.75	36.11	33.55	0.02
Port Blair	71.67	40.33	35.00	—	61.33	40.67	72.50	79.00	5.34
Bangalore	42.52	23.03	4.19	47.69	43.70	34.74	42.57	56.68	0.79
Jammu	62.03	67.16	58.80	62.03	61.16	54.56	68.60	78.43	4.59
Mizoram	16.51	12.92	13.85	14.32	14.08	14.57	14.77	13.99	0.06
Jorhat	60.90	26.53	63.26	64.82	69.80	66.14	77.35	39.17	15.20
Average	53.57	45.20	48.36	50.34	56.26	48.77	58.35	60.17	

Table 4.30. Time taken for first harvest in different strains of *Pleurotus* (in days) on paddy straw

Location	Strains								CD (5%)
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	
Pune	26.13	28.70	25.40	25.03	24.87	24.67	27.20	23.67	0.93
Pasighat	48.00	36.00	—	45.00	26.00	42.00	36.00	29.00	2.10
Vellayani	27.00	25.77	29.17	28.37	22.30	23.80	25.40	23.70	2.07
Coimbatore	16.26	17.76	18.90	18.53	19.80	21.00	20.50	18.86	3.55
Bhubaneswar	45.87	45.63	30.50	37.43	47.67	—	24.60	47.43	0.68
Meerut	24.00	22.30	25.00	20.00	20.30	24.00	23.10	22.60	3.00
Manipur	33.90	32.70	34.80	32.40	32.10	31.30	17.80	27.80	0.50
Kalyani	21.00	21.27	22.23	21.87	24.17	24.23	22.47	21.07	0.32
Port Blair	33.00	46.00	36.00	—	18.70	17.00	11.00	18.30	8.10
Bangalore	27.00	23.00	23.00	25.00	25.00	22.00	22.00	22.00	-
Jammu	30.86	31.30	31.16	31.40	30.76	31.03	30.86	30.70	1.10
Mizoram	25.90	26.43	26.26	27.00	25.63	28.30	25.10	27.30	0.06
Jorhat	24.33	26.56	26.11	26.33	25.44	24.44	17.33	24.22	2.43
Average	29.48	29.49	27.38	28.20	26.36	24.14	23.34	25.90	



Table 4.31. Average fruit body weight in different strains of *Pleurotus* (in g) on paddy straw

Location	Strains								CD (5%)
	P18-01	P18-02	P18-03	P18-04	P18-05	P18-06	P18-07	P18-08	
Pune	4.09	5.03	3.19	2.77	4.35	2.52	2.26	4.34	1.23
Pasighat	54.00	47.00	—	10.00	47.00	18.00	47.00	30.00	0.80
Vellayani	8.21	5.73	4.70	4.32	7.90	10.07	5.81	11.05	1.72
Coimbatore	14.51	13.99	16.53	13.39	19.08	8.74	17.42	11.14	4.79
Bhubaneswar	4.28	5.02	4.08	3.64	2.77	—	4.37	4.59	0.32
Meerut	37.30	32.60	40.00	36.00	45.50	36.00	38.30	30.60	3.80
Manipur	12.13	11.82	9.36	15.57	11.96	15.62	14.28	12.41	0.08
Kalyani	5.73	13.23	8.95	9.04	11.74	10.50	11.69	9.07	NS
Jammu	14.56	15.51	13.71	14.26	14.31	13.32	14.26	14.52	1.03
Mizoram	7.31	4.97	5.94	8.11	6.57	8.53	8.11	7.50	0.06
Jorhat	8.25	9.00	8.50	8.00	8.45	9.50	10.00	9.00	0.29
Average	15.49	14.90	11.50	11.37	16.33	12.07	15.77	13.11	



Fig. 4.77. Crop at Pune centre



Fig. 4.78. Crop at Pasighat centre



Fig. 4.79. Crop at Vellayani centre



Fig. 4.80. Crop at Coimbatore centre



Fig. 4.81. Crop at Bhubaneshwar centre



Fig. 4.82. Crop at Manipur centre



Fig. 4.83. Crop at Kalyani centre



Fig. 4.84. Crop at Port Blair centre



Fig. 4.85. Crop at Bangalore centre



Fig. 4.86. Crop at Mizoram centre

centre with an average yield of 127.27 kg/100 kg paddy straw. Minimum yield of 12.92 kg /100 kg paddy straw was recorded at Mazoram centre in strain P-18-02. Maximum BE was recorded at Coimbatore centre in all the strains. Overall average showed P-18-08 performed best at all the centre with an average yield of 60.17 kg/ 100 kg of Paddy straw.

The first harvest time was differed in different strain at different centres (Table. 4.30). The minimum time taken for the first harvest was recorded as 11 days at Port blair centre in P-18-07 strain while maximum first harvest time of 48

days was recorded at Pasighat centre in PI-18-01 strain. The least first harvest time in all the strains was recorded at Coimbatore centre. Maximum fruit body weight of 54.0 g was recorded in strain P18-01 at Pasighat centre while the lowest Fruit body weight of 2.26g at Pune centre in P18-07 strain (Table 4.31).

2.2 Evaluation of different compost formulation for button mushroom

The trial was assigned to seven different centres Murthal, Nauni, Pune, Ludhiana, Palampur, Udaipur and Samastipur. The compost

Table. 4.32. Compost formulae used

Ingredients							
Formula I (kg)		Formula II (kg)		Formula III (kg)		Formula IV (kg)	
Wheat straw	1000	Mustard straw	1000	Paddy straw	1000	Baggasse	1000
Chicken manure	400	Chicken manure	400	Chicken manure	400	Chicken manure	500
Wheat bran	100	Wheat bran	45	Urea	10	Urea	20
Urea	14.5	Urea	3	Ammonium sulphate	10	Cotton seed cake	25
Gypsum	30	Gypsum	40	Gypsum	80	Gypsum	80

Table 4.33. Analysis of composite compost sample (dry weight basis)

Parameter	Value											
	I			II			III			IV		
	Moisture (%)	pH	N (%)	Moisture (%)	pH	N (%)	Moisture (%)	pH	N (%)	Moisture (%)	pH	N (%)
Ludhiana	65-67	7.4	2.2	63-66	7.0	1.8	60-64	7.5	2.3	64-66	7.0	2.0



Table 4.34. Yield, days to first harvest and average fruit body weight of button mushroom on different compost

Compost Formula	Ludhiana	First harvest days	Average fruit body wt
I	14.82	25	11.3
II	3.56	48	10.9
III	9.56	33	12.2
IV	5.82	52	13.2
CD (0.05)	0.8		

formulae used is given in Table 4.32. Only Ludhiana centre has reported the successful results. The Prepared compost parameters are given in the Table 4.33. Reviewing the parameters it could be observed that the nitrogen percent in compost prepared through different formulation was within the range for good compost.

The results showed that yield of compost made by different composition have different yield (Table 4.19). Very low yields were recorded in formulation II and IV. The quality of the produce was at par in all the compost, however, first harvest time was ver high in compost formulations II and IV (Table 4.34).

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

Different Centers have reported the collection of specimens of wild mushrooms during the year and about 466 collections have been

made and a total of 342 specimens/cultures were deposited at the DMR Gene Bank with passport data and accession numbers were given to 130

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	6	6	6
TNAU, Coimbatore	12	12	10
MPKV, Pune	54	21	16
GBPUA&T, Pantnagar	21	21	6
IGKV, Raipur	00	0	0
MPUAT, Udaipur	22	22	7
KAU, Kerala	22	22	16
HAU, Hisar	1	0	0
OUAT, Bhubneshwar	12	0	0
RAU, Samastipur	0	0	0
CAU Pasighat	3	3	3
HAIC, Murthal	0	0	0
HPKV, Palampur	1	0	0
ICAR RC NEH Region, Barapani	0	0	0
ICAR RC, Sikkim	0	0	0
ICAR RC, Arunachal Pradesh	0	0	0
ICAR RC, Nagaland	33	16	9
ICAR RC, Mizoram	0	0	0
ICAR RC, Tripura	0	0	0
ICAR RC, Manipur	16	4	4
ICAR-RC ER, Ranchi, Jharkhand	5	0	0
ICAR-CARI, Port Blair	0	0	0
IIHR, Bangalore	0	0	0
UHF, Nauni	5	5	5
VPKAS, Almora	10	0	0
SKUAST, Kashmir	28	0	0
SKUAST, Jammu	6	6	6
AU Assam	2	0	0
SVBP, Meerut	3	0	0
BCKV, Kalyani	0	0	0
DAU, Gujrat	0	0	0
ANGRAU, Hyderabad	0	0	0
ICAR-DMR, Solan	204	204	42
Total	466	342	130



cultures. Rest of the cultures was contaminated. The outcome has been summarized in table 5.1.

1. PAU, Ludhiana

Wild mushroom flora was surveyed in the districts of Punjab during the months from July to

September, 2018. Six mushrooms were collected and accessioned as DMRO-1102 to DMRO-1107 (Fig.1). Mushrooms were identified as *Macrolepiota* sp. (DMRO 1102), *Armillaria mellea* (DMRO 1103), *Agaricus porphyrocephalus* (DMRO 1104), *Coprinus plicatilis* (DMRO 1105), *Agaricus* sp (DMRO 1106) and *Lepiota* sp. (DMRO 1107).

Data of Collected Specimen

S.No.	DMR Accession Number	Habitat	GPS DataN x E x Alt (m)	Identification
1.	DMRO 1102	Humus	75°48'2"E30°39'18"N269 m	<i>Macrolepiota</i> sp.
2.	DMRO 1103	Humus	75°45'28"E30°43'5" N252 m	<i>Armillaria mellea</i>
3.	DMRO 1104	Humus	76°21'70"E30°70'71"N254 m	<i>Agaricus porphyrocephalus</i>
4.	DMRO 1105	Humus	75° 51' E30° 55' N251 m	<i>Coprinus plicatilis</i>
5.	DMRO 1106	Humus	74°83'25" E30°85'199" N199 m	<i>Agaricus</i> sp
6.	DMRO 1107	Sand	30°48'3" E76°59'5" N271 m	<i>Lepiota</i> sp.



Macrolepiota sp.



Armillaria mellea



Agaricus porphyrocephalus



Coprinus plicatilis



Agaricus spp.



Lepiota sp.

Fig 5.1. Mushroom germplasm collected by PAU, Ludhiana

2. TNAU Coimbtore

During 2018-19, a total number of twelve wild mushroom specimens have been collected, identified, pure cultured and deposited with DMR culture collection facility. All the specimen viz., CBE-TNAU 18-01 to CBE-TNAU-18-01-12 (12 Nos) have been collected during September to December 2018 (Fig 2). Based on morphological characters, the cultures were identified

tentatively with identification key. The filled proforma / passport data for the wild mushroom collections along with pure cultures, dried mushroom specimens and photographs were sent to DMR,Solan during the first week of January 2019 for obtaining accession numbers. During May 2019, Six wild mushrooms species belonging to the genus Ganoderma, Fomes and Coprinus sp. were collected and pure cultured.

Data of Collected Specimen

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1	CBE-TNAU-18-01		Leaf litter in red soil	Longitude :76.93 ° E Latitude : 11 .0123°N	<i>Termitomyces</i> sp
2	CBE-TNAU-18-02		Decayed straw heaps	Longitude :76.93 ° E Latitude : 11 .0123°N	<i>Volvariella</i> sp.
3	CBE-TNAU-18-03		Wooden stumps	Longitude : 77.02° N Latitude : 11.01 ° E	<i>Polyporus</i> sp
4	CBE-TNAU-18-04		Soil on fallen dried leaves	Longitude : 76.84 ° E Latitude : 10.989 ° N	<i>Marasmius</i> sp
5	CBE-TNAU-18-05		Wood logs	Longitude : 76 935° E Latitude : 11.012 ° N	<i>Schizophyllum</i> <i>commune</i>
6	CBE-TNAU-18-06		Humus / soil	Longitude : 76.9855° Latitude : 11.0123 ° N	<i>Agaricus</i> sp
7	CBE-TNAU-18-07		Tree stumps	Longitude : 76.99° Latitude : 11.013 ° N	<i>Ganoderma</i> <i>lucidum</i>
8	CBE-TNAU-18-08		wooden stumps	Longitude : 77.5826.° E Latitude : 11.2746 ° N	<i>Schizophyllum</i> <i>commune</i>
9	CBE-TNAU-18-09		Coconut Tree roots	Longitude : 79.7034° E Latitude : 12.884 ° N	<i>Calocybe</i> indica
10	CBE-TNAU-18-10		<i>Delonix regia</i> tree roots	Longitude : 76.9558° E Latitude : 11 .0168° N	<i>Calocybe</i> indica
11	CBE-TNAU-18-11		Tree stumps	Longitude : 76.9855° E Latitude : 11.0123 ° N	<i>Ganoderma</i> <i>lucidum</i>
12	CBE-TNAU-18-12		Humus soil	Longitude : 76.9558° E Latitude : 11.0168 ° N	<i>Agaricus</i> sp



Termitomyces sp.



Volvariella sp.



Polyporus sp.



Marasmius sp.



Agaricus sp.



Agaricus sp.



Ganoderma sp.



Schizophyllum commune



Calocybe sp.



Calocybe sp.



Ganoderma sp.



Agaricus sp.

Fig. 5.2. Germplasm collected by TNAU, Coimbatore



Sr.No	Sample No.	DMR accession number	Habitat	GPS data	Identification
22	PN-18-22	-	Humus	La-15°54'43"N Lo-73°59'4" E	<i>Termitomyces</i> sp.
23	PN-18-23	-	Sand	La-15°52'44"N Lo-73°47'51" E	<i>Tricholoma</i> sp.
24	PN-18-24	-	Tree trunk	La-15°57'25"N Lo-73°44'04" E	Unidentified
25	PN-18-25	-	Tree trunk	La-15°56'06"N Lo-73°43'00" E	<i>Pleurotus</i> sp.
26	PN-18-26	-	Tree trunk	La-15°59'03"N Lo-73°41'17" E	<i>Pholiota</i> sp.
27	PN-18-27	-	Dead tree trunk	La-15°59'59"N Lo-73°40'60" E	<i>Tricholoma</i> sp.
28	PN-18-28	DMRO-1118	Tree trunk	La-16°09'13"N Lo-73°41'08" E	<i>Auricularia</i> sp.
29	PN-18-29	-	Sandy soil	La-16°13'46"N Lo-73°42'19" E	<i>Pholiota</i> sp.
30	PN-18-30	-	Humus	La-16°17'36"N Lo-73°42'39" E	<i>Termitomyces</i> sp.
31	PN-18-31	-	Tree trunk	La-16°39'22"N Lo-73°31'26" E	<i>Cantherellus</i> sp.
32	PN-18-32	+	Tree trunk	La-18°16'47"N Lo-75°50'10" E	<i>Macrocybe gigantia</i>
33	PN-18-33	-	Dead wood tree trunk	La-18°16'36"N Lo-75°46'01" E	<i>Auricularia</i> sp.
34	PN-18-34	+	Humus	La-18°17'19"N Lo-75°52'07" E	<i>Calocybe</i> sp.
35	PN-18-35	-	Tree trunk	La-18°16'39"N Lo-75°46'03" E	<i>Auricularia</i> sp.
36	PN-18-36	-	Tree trunk	La-18°17'51"N Lo-75°56'40"E	<i>Pleurotus</i> sp.
37	PN-18-37	-	Tree trunk	La-18°17'52"N Lo-75°56'42"E	<i>Cantherellus</i> sp.
38	PN-18-38	DMRO-1119	Dead tree trunk	La-18°17'53"N Lo-75°56'45"E	<i>Pleurotus</i> sp.
39	PN-18-39	-	Wooden stump	La-18°17'54"N Lo-75°56'45"E	<i>Ramaria</i> sp.
40	PN-18-40	-	Dung	La-18°17'54"N Lo-75°56'46"E	<i>Coprinus</i> sp.
41	PN-18-41	DMRO-1120	Tree trunk	La-18°19'42"N Lo-76°32'04" E	<i>Pleurotus</i> sp.
42	PN-18-42	+	Tree trunk	La-18°14'06"N Lo-76°30'09" E	<i>Calocybe</i> sp
43	PN-18-43	+	Humus	La-18°06'29"N Lo-76°18'13" E	<i>Trocholoma</i> sp.
44	PN-18-44	-	Humus	La-18°32'14"N Lo-73°50'35"E	<i>Termitomyces</i> sp.
45	PN-18-45	DMRO-1121	Humus	La-19°04'23"N Lo-73°32'10"E	<i>Oudemansiella</i> sp
46	PN-18-46	-	Humus	La-19°04'28"N Lo-73°32'07"E	<i>Agaricus</i> sp.
47	PN-18-47	-	Soil/Humus	La-18°32'14"N Lo-73°50'39"E	<i>Termitomyces</i> sp.
48	PN-18-48	DMRO-1122	Humus	La-18°33'08"N Lo-73°49'36"E	<i>Tricholoma</i> sp.
49	PN-18-49	-	Humus/Soil	La-18°33'11"N Lo-73°49'31"E	<i>Tricholoma</i> sp.
50	PN-18-50	DMRO-1123	Dead wood trunk	La-18°34'06"N Lo-73°49'29"E	<i>Pleurotus</i> sp.
51	PN-18-51	-	Humus	La-18°34'07"N Lo-73°49'30"E	<i>Termitomyces</i> sp.
52	PN-18-53	-	Tree trunk	La-18°34'08"N Lo-73°49'29"E	<i>Pleurotus</i> sp.
53	PN-18-54	-	Soil/Sand	La-18°34'09"N Lo-73°49'31"E	<i>Agaricus</i> sp.
54	PN-18-55	-	Tree trunk	La-18°34'03"N Lo-73°49'30"E	<i>Pleurotus</i> sp.



Fig. 5.3. Germplasm collected by Pune Centre

4. Pantnagar Centre

During the survey work, in all 21 samples were collected and identified on the basis of mycological characters. Among the identified samples, some species belonged to genera viz. *Pleurotus*, *Agaricus*, *Termitomyces*, *Ganoderma*, etc. The tissue isolation of the collected samples

was done and in all 21 pure mushroom cultures was successfully derived and maintained. The pure cultures along with identification proforma sheets, spore prints, dry fruit sample and cultures were submitted to DMR, Chambaghat, Solan (HP). Out of 21 cultures deposited, in all 6 cultures received the accession numbers.



Table. Accession numbers of germplasms of wild mushrooms allotted by DMR, Solan

S.No	Sample No.	DMR accession number	Habitat	GPS data	Identification
1	Pant 1/18	DMRO-1157	Wooden stump	N 029.028234E 079.47446	<i>Pleurotus</i> sp.
2	Pant 2/18	DMRO-1158	Soil	N 029.028234E 079.47446	<i>Agaricus</i> sp.
3	Pant 3/18	DMRO-1159	Tree	N29.5892410E79.6466677	<i>Ganoderma</i> sp.
4	Pant 4/18	DMRO-1160	Wood	N29.584189E 79.653890	<i>Pleurotus</i> sp.
5	Pant 5/18	DMRO-1161	Humus	N29.3947643E79.1264997	<i>Termitomyces</i> sp.
6	Pant 6/18	DMRO-1162	Humus	N 029.028242E 079.47450	<i>Agaricus</i> sp.



Pant 1/18



Pant 2/18



Pant 3/18



Pant 4/18



Pant 5/18



Pant 6/18

Fig. 5.4. Germplasm collected by Pantnagar Centre

5. IGKVV, Raipur

Regular surveys of fleshy fungi were conducted in six district of Chhattisgarh including forest area and market. The mushrooms were collected from different habitat like forest rotten plant parts decaying wood etc. The fungi were also collected from market were local inhabitants collected from nature and sale. 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 each sample was done very meticulously with the help of standard manuals and microscopic and macroscopic characters were recorded with due care. The collected samples were preserved in 4% formalin solution and dried sample have also been preserved.

Table: Wild edible mushroom collection, identification and conservation.

Sl.No.	Name of Fungi	Habitat/ Substrates	GPS Data/Location	Month of collection	Edibility	Designation
1	<i>Calocybe indica</i> * Milky mushroom	On the base of of Peepal tree	N 21°14.324’ E81°42.363’ Altitude 328m	Aug, 2018	edible	IGKV-CI-2018/01
2	<i>Volvariella volvacea</i> *	Leaf litter of Sarai forest	Tamnar, Raigarh	Aug 2018	edible	IGKV-VV-2018/01
3	<i>Volvariella volvacea</i> *	Rotten heap of paddy straw	Tamnar, Raigarh	Aug 2018	edible	IGKV-VV-2018/02
4	<i>Hypsizygous</i>	Mango tree	Raipur Horticulture farm	December 2018	edible	IGKV-Hyp-2018/ 01

The detailed microscopic and microscopical characters are discussed hereunder:

01. IGKV-CI/2018/01 (*Calocybe indica*) milky mushroom: This fleshy fungus was collected from beneath the peepal tree of SPP office of College of Agriculture Raipur. The GPS location was recorded as **N 21°14.324’ E81°42.363’ Altitude 328m**. The basidiocarps were in groups and collected from rhizosphere area of people tree. The colour of basidiocarps were white non hygrophanous, smell fungoid, scales were absent cap/pileus dia **3.45-4.32cm**, stipe white, attached centrally, stipe length **6.70cm (L) X 2.5 cm (b)** and **width 2.32 cm**, lamellae smooth, adnate, sample deposited in DMR repository.

02. IGKV-VV/2018/01 (*Volvariella volvacea*): This mushroom was collected

from rotten heap of paddy straw of sarai forest Tamnar village district Raigarh. The colour of sporophore was grey/ brown solitary pileus open spore prints were red to brown. pileus **dia 8.01-8.12cm**, stipe white, attached centrally, stipe length **5.98cm (L) X 1.98 cm (b)** and **volva 2.54 cm**, lamellae smooth, adnate, sample deposited in DMR repository

03. IGKV-VV/2018/02 (*Volvariella volvacea*): This mushroom was collected from rotten heap of paddy straw of sarai forest Tamnar village district Raigarh. The colour of sporophore was grey/ brown solitary pileus open spore prints were red to brown. pileus **dia 7.32-8.52cm**, stipe white, attached centrally, stipe length **5.68cm (L) X 2.98 cm (b)** and **volva 2.54 cm**, lamellae smooth, adnate, sample deposited in DMR repository.

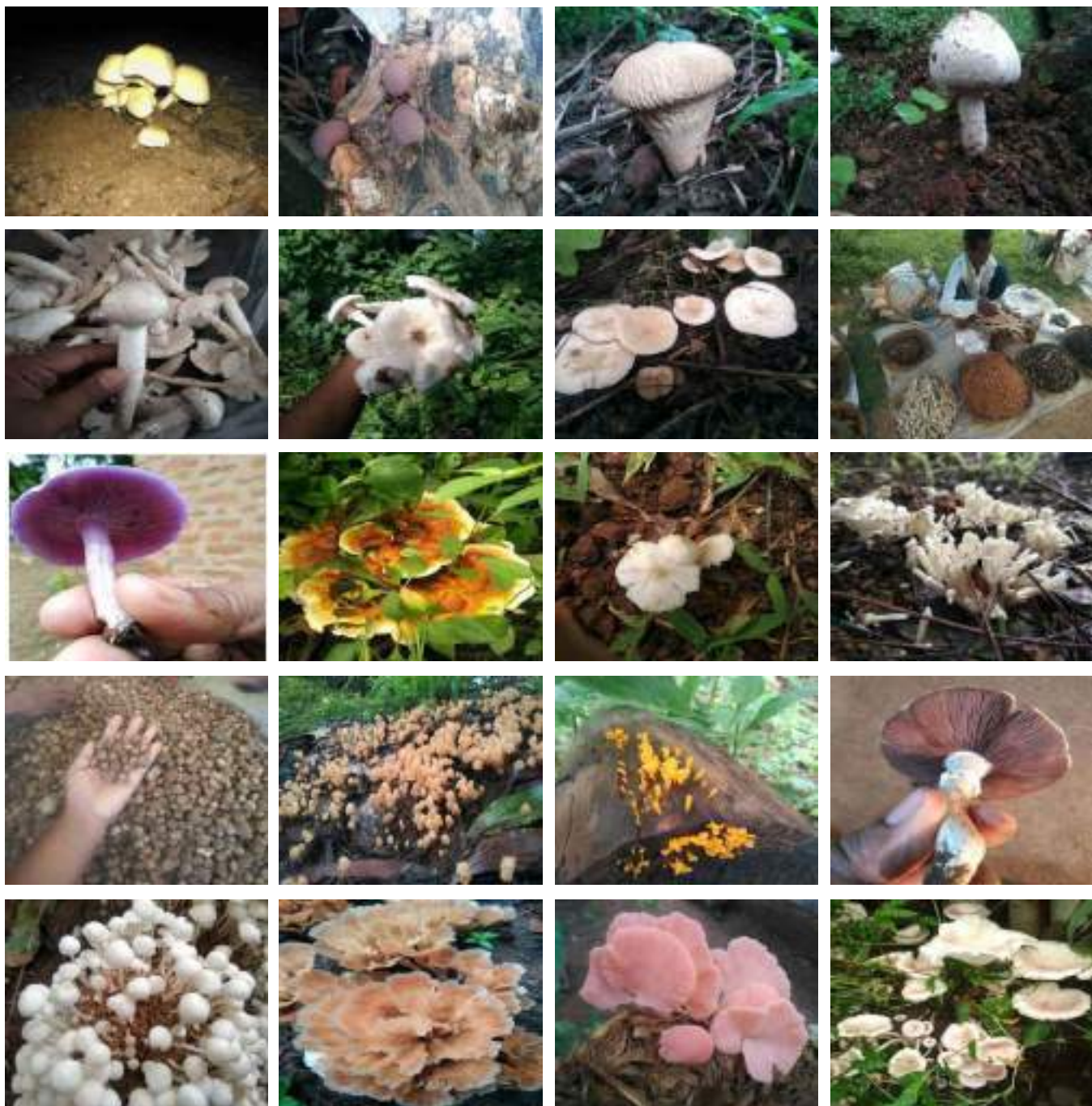


Fig. 5.5. Germplasm collected by Raipur Centre

6. MPUAT, Udaipur

Total Eight forays were conducted for collection, identification and conservation of wild edible mushrooms during monsoon season of 2018 in the month of July, August and September. Total of 22 different wild mushrooms specimens

were collected from Forests of Udaipur, Forest of Mount Abu, Forest of Sawai-Madhopur, Forest of Sikar & Sita Mata forest. Some important edible mushrooms collected were *Podaxis pistillaris*, *Agaricus* spp., *Polypore* spp., *Coriolus versicolor*, *Geaster* spp., *Ganoderma* spp. , *Pleurotus* spp.,

Termitomyces spp., Tricholoma spp., Pseudocoprinus sp., Podaxis pistillaris, Phomes

spp., Trametes versicolor and Volvariella volvacea.

S. No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1	UD-02/18	DMRO-1139	On dead wood Pipal	N-24°28.784' E-074°15.180' Elevation- 494m	Ganoderma lucidum
2	UD-03/18	DMRO-1140	On living tree of bargad	N-24°20.820' E-074°21.896' Elevation- 497m	Tricholoma spp
3	UD-04/18	DMRO-1141	On dead wood babool	N-24°20.820' E-074°21.896' Elevation- 497m	Ganoderma applanatum
4	UD-13/18	DMRO-1142	On dead wood	N-29°20.813' E-074°21.928' Elevation- 499m	Amanita/Lepiota
5	UD-17/18	DMRO-1143	On soil	N-24°33.377' E-073°40.681' Elevation- 524 m	Podaxis pistillaris is Gasteromycetous mushroom
6	UD-19/18	DMRO-1144	On dead wood	N-25°09.930' E-073°29.732' Elevation- 412 m	Polypores sp.
7	UD-20/18	DMRO-1145	On dead wood	N-25°09.930' E-073°29.732' Elevation- 412 m	Phomes sp.





Fig. 5.6. Germplasm collected by Udaipur Centre

7. KAU, Kerela

Surveys were conducted in Trivandrum, Kollam, Idukki districts of Kerala. A total of 22 specimens were obtained. These were isolated and brought into pure culture. Cultures of 22 specimens were deposited to DMR and accession

numbers were obtained for 16 cultures. The specimens obtained were *Pleurotus djamor*, *Tricholomopsis*, *Laccaria*, *Marasmius*, *Schizophyllum*, *Agaricus campestris*, *Postia*, *Agaricus bingensis*, *Calocybe*, *Lentinus*, *Cordyceps*, *Volvariella*.

Data of collected specimen

S. No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1	VLYN-18-147	DMRO 1074	Wooden tree stump	Latitude 77.10 E Longitude 9.91'N	<i>Pleurotus djamor</i>
2	VLYN-18-148	—	Coconut stump	Latitude 76.98 E Longitude 8.43N	<i>Tricholomopsis</i>
3	VLYN-18-150	DMRO 1075	Humus	Latitude 76.98 E Longitude 8.43N	<i>Laccaria</i>
4	VLYN-18-151	DMRO1076	Tree stump in rounds	Latitude 76.61 E Longitude 8.8N	<i>Marasmius</i>
5	VLYN-18-153	DMRO 1077	Tree stump	Latitude 76.61 E Longitude 8.43N	<i>Schizophyllum</i>
6	VLYN-18-154	DMRO 1078	Lawn	Latitude 76.98 E Longitude 8.43N	<i>Agaricus campestris</i>
7	VLYN-18-156	DMRO 1079	Tree trunk	Latitude 76.98 E Longitude 8.43N	<i>Postia</i>
8	VLYN-18-157	DMRO 1080	Lawn	Latitude 76.98 E Longitude 8.49N	<i>Lycoperdon</i>
9	VLYN-18-158	DMRO 1081	Coconut tree trunk	Latitude 76.61 E Longitude 8.8N	<i>Calocybe</i>
10	VLYN-18-159	DMRO 1082	Humus rich soil	Latitude 76.98 E Longitude 8.43N	<i>Boletus</i>
11	VLYN-18-160	DMRO1083	Humus	Latitude 77.10 E Longitude 9.91'N	<i>Agaricus bisporus</i>

S. No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
12	VLYN-18-161	DMRO 1084	Woody stump	Latitude 77.10 E Longitude 8.5'N	Lentinus
13	VLYN-18-162	DMRO 1085	Humus rich soil	Latitude 77.10 E Longitude 8.5'N	<i>Agaricus bingensis</i>
14	VLYN-18-163	DMRO 1086	Humus rich soil	Latitude 76.98 E Longitude 8.43N	Clitocybe
15	VLYN-17-164	DMRO 1087	Wooden stump	Latitude 76.98 E Longitude 8.43N	<i>Pleurotus djamor</i>
16	VLYN-18-165	DMRO 1088	Sandy soil	Latitude 75.08 E Longitude 12.31 N	Cordyceps
17	VLYN-17-166	DMRO 1089	Humus	Latitude 76.98 E Longitude 8.5N	Volvariella



Fig. 5.7. Germplasm collected by Vellayani Centre

8. OUAT, Bhubaneshwar

Surveys were conducted in six districts i.e. Khordha, Nayagarh, Puri, Koraput, Keonjhar and Rayagada during Kharif, 2018. Twelve indigenous mushrooms have been collected and identified

based on available information. They were *Boletus* sp., *Calocybe indica*, *Pleurotus* sp., *Russula rosea.*, *Russula nigricans*, *Termitomyces* sp., *Termitomyces microcarpus*, *Tuber ruffum*, *Volvariella volvacea*.



Fig. 5.8. Germplasm collected by Bhubaneshwar Centre

9. CAU, Pasighat

Market survey was start up after rain in the month of April 2018 onward to November 2019. Local peoples are collecting the mushrooom (Shiitake only locally known as Lollung) from

mariyang (district upper siang) and sold in the market the price was Rs. 250/ kg. Three places viz., Bogibill Ghat, Mebo and Napit were selected for operation of this work. The entire edible species are attempted to culture in the laboratory. Throughout collections of species

Data of collected specimen

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1.	CHF-18-01		Soil	Longitude N 28°11'44.79" Latitude E 095°19'23.00" Altitude 175m	Cap and Stipe Present
2.	CHF-18-02		Soil	Longitude N 28°07'44.23" Latitude E 095°18'58p .31" Altitude 160m	Cap and Stipe Present
3.	CHF-18-03		Soil	Longitude N 28°03'44.32" Latitude E 095°18'58.33" Altitude 152m	Cap and Stipe Present



CHF-18-01



CHF-18-02



CHF-18-03



Mushroom sold in the market of Pasighat

Fig. 5.9. Germplasm collected by Pasighat Centre

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.

10. HPKV, Palampur

Collected one *Morchella* sp. growing from wall behind kitchen garden at Palampur on 3^h April 2019.



Fig. 5.10. Germplasm collected by Palampur Centre



11. ICAR-RC regional Centre, Manipur

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

and Nov. 2018. A total of 16 different mushroom specimens were collected, out of which pure culture/dried specimen of 4 mushrooms were submitted to ICAR-DMR, Solan. The details of these specimens are given as below

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1.	IMP/2018/01	DMRO-1153	Wooden stumps and under oak trees	24° 59' 9.095" N 93° 30' 14.388" E	
2.	IMP/2018/02	DMRO-1154	Wooden stumps and under oak trees	24° 59' 9.095" N 93° 30' 14.388" E	
3.	IMP/2018/03	DMRO-1155	Under oak tree	24° 48' 59.58" N 93° 56' 31.632" E	
4.	IMP/2018/04	DMRO-1156	On dry stumps of oak tree	25° 9' 39.103" N 93° 40' 52.395" E	



Fig. 5.11. Germplasm collected by Manipur Centre

12. ICAR-RC regional Centre, Nagaland

During the period, around 33 naturally growing seasonal mushrooms were collected and

documented from Nagaland. Out of which, 16 mushroom were categorized under edible mushroom. Out of edible mushroom, we received the accession number for nine culture.

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1	NL-17/3	DMRX-1656	Wood		Shiitake
2	NL-17/22	DMRX-1657	Arekanut Tree	Jharnapani	Oystersp.
3	NL-18/2	DMRX-1658	Wood	Mokokchung	Oystersp.
4	NL-18/3	DMRX-1659	Wood	Zunheboto	
5	NL-18/4	DMRX-1660	Wood	Mokokchung	
6	NL-18/6	DMRX-1661	Wood	Mokokchung	Oyster
7	NL-18-08	DMRO-1150	Wood	Medziphema	Auricularia
8	NL-18-28	DMRO-1151	Soil	Medziphema	
9	NL-18-30	DMRO-1152	Wood		



NL-17/03



NL-17/22



NL-18/2



NL-18/3



NL-18/4



NL-18/6



CHF-18-01



CHF-18-02



CHF-18-03

Fig. 5.12. Germplasm collected by Nagaland Centre

13. ICAR-RC regional Centre, Sikkim

In the year 2018-19, four different wild edible mushrooms were collected from Gangtok and nearby areas. They were assigned the sample no. as SK-1901, 1902, 1904 and 1905. Pure cultures

for all these wild mushrooms were obtained and submitted to ICAR-DMR and the accession umbers have been mentioned below. SK1901 is called as Kannae cheaoe, SK1904 is called as Chiplae Cheaoe and SK1905 is called as Jhari Cheaoe in Nepali.

S.No.	Sample No	DMR Accession Number	Habitat	Identification
1	SK-1901	DMRO-1146	Wooden logs	Blackish tinge on the upper surface
2	SK-1902	DMRO-1147	Wooden logs	Small pileus with long stalk, bright yellow in colour
3	SK-1904	DMRO-1148	Wooden logs	Light brownish and jelly like
4	SK-1905	DMRO-1149	Soil	Small pileus with cuts in between, long stalk, white colour





Fig. 5.13. Germplasm collected by Sikkim Centre

14. ICAR-RC for Eastern Region, Research Centre, Plandu, Ranchi

Surveys were conducted in the local markets for Ranchi and nearby forest. Four types of naturally grown wild edible mushrooms were identified and collected from Saal forest, Termitarium of termites from the local forest of Ranchi, Jharkhand. Among the wild edible mushroom, Tecnus (*Termitomyces* species) and *Rugda* were widely collected by mushroom

collector/hunters while a *Rasulla* species and *Amanita* species were also collected by the collector but collection was less than majors ones. These wild edible mushrooms play an important role in promotion of rural livelihood. These wild edible mushrooms were collected in rainy season from the month of July to August and sold at a premium price @ Rs. 600-800/kg in the local market. These mushrooms are known for its delicacy and taste (Fig.11).



Fig. 5.14. Wild edible mushroom collected from the local market and neighboring forest of Ranchi



15. YS Parmar University, Nauni

Various cultures collected from forests of Nauni, Soaln and Rohru Distt. Shimla (HP), isolated on media and submitted to Directorate

of Mushroom Research. The specimens UHF-1, UHF-2,UHF-3 and UHF-4 were collected from Nauni, Distt. Solan (HP) whereas Specimen No.5 (Morchella sp.) was collected from Rohru, Distt. Shimla (HP).

Data of collected specimen

S.No.	Sample No	DMR Accession Number	Habitat	Identification
1.	UHF-1	Not allotted	Pine Forest	-
2.	UHF-2	-	Pine Forest	-
3.	UHF-3	-	Forest	Rusulla SP.
4.	UHF-4	-	Forest	-
5.	UHF-5	-	Deodar Forest	Morchella sp.



Fig. 5.15. Germplasm collected by Nauni Centre

16. HAU, Hisar

During rainy season only one edible (*Podaxis* sp.) wild mushroom was collected from Hisar, Bhiwani and Fatehabad districts. Efforts were made to culture the fungus on potato dextrose agar and malt extract agar medium, but it could not be cultured. In addition, *Ganoderma* spp. was also obtained from *Prosopiscinerea*, *Delbergiasisoo* , *Acacia niloticain* Bhiwani

and Hisar districts and these samples were preserved.

17. VPKAS, Almora center

Survey was conducted during the rainy season in Almora, Bageshwar and Pithoragarh districts. Total of 10 mushroom samples were collected, brought to laboratory for culture. However, succeeded in culturing only two mushrooms namely, *Auricularia* and *Pleurotus* spp.



Fig. 5.16. Germplasm collected by Nauni Centre

18. SKUAST, Jammu

Surveys were conducted in Bhadarwah area of Doda and Chennani area of Udhampur district during the year 2018-19 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

Data of collected specimen

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1	J-18-19-7	DMRX-1662	Humus	32°58'N, 75 °42'E5314 ft. asl	Unknown
2	J-18-19-6	DMRX-1663	Humus	32°58'N, 75 °42'E5314 ft. asl	<i>Geospora</i> spp.
3	J-18-19-5	DMRX-1664	Humus	32°58'N, 75 °42'E5298 ft. asl	<i>Morchella</i> spp.
4	J-18-19-12	DMRX-1665	Humus	32°58'N, 75 °42'E5292 ft. asl	<i>Morchella</i> spp.
5	J-18-19-72	DMRO-1127	Wodden log	32°43'N, 74 °52'E3290 ft. asl	<i>Pleurotus</i> spp.
6	J-18-19-68	DMRO-1128	Wodden log	32°43'N, 74 °52'E3290 ft. asl	Unknown



J-18-19-05



J-18-19-06



J-18-19-07



J-18-19-12



J-18-19-68



J-18-19-72

Fig. 5.17. Germplasm collected by Jammu Centre

of the centre. Dried samples as well as cultures of wild mushroom were submitted to DMR, Solan and following accession numbers have been obtained.

19. SKUAST, Srinagar

Survey for collection of mushrooms was conducted during the month of April-May and Sep-Oct months of 2018-19 to different locations of



Peziza spp.



Agrocybe spp.



Flamulina spp.



Morchella spp.



Morchella spp.



Lentinus spp.



Lentinus tigrinus



Morchella spp.



Puf balls



Coprinus comatus



Inocybe spp.



Hericium spp.



Polyporus squamosus



Polyporus squamosus



Helevella spp.



Coprinus spp.



Lycoperdon perlatum



Pleurotus spp.



Helevella spp.



Local mushroom collector



Coprinus micacius



Coprinus micacius



Fomes fomentarius



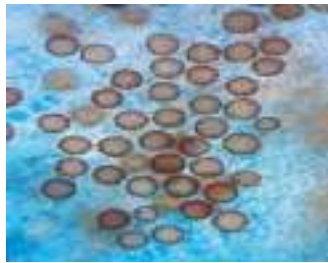
Golden oyster



Puf ball



Cross section of Puf ball



Spore photograph



Fig. 5.18. Collection of edible and medicinal germplasm from different locations of Srinagar



district Bandipora (Nadihal, Mitrigam , pethkot), district Ganderbal (Ganiwan, Naranag), district Srinagar (Darah Harwan, Brein Nishat), district Kupwara (Poshwani , Dangiwachha), to collect wild edible and medicinal mushrooms of the region. Spot photographs of the samples in wild were taken. Spore prints and dry specimen were ever possible were preserved.

20. AAU, Jorhat

One edible specimen was collected from the wild from Kuwaripukhuri, Jorhat and another sample from market was collected. Wild specimen is yet to be identified and the specimen from the market is edible Pleurotus.

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
1.	2/18	Will be submitted while attending workshop.	Forest soil	N27°10'14.873	Not identified.
2.	3/18	-do-	Market	-	Pleurotus sp.



Fig. 5.19. Germplasm collected by Jorhat centre

21. SBPUAT, Meerut

Three samples were collected by Meerut centre in Kharif 2019.

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
01.	Vallabh-1801	NA	Soil	29° 01' N 77° 45' E	NA
02.	Vallabh-1802	NA	Soil	29° 01' N 77° 45' E	NA
03.	Vallabh-1803	NA	Soil	29° 01' N 77° 45' E	NA

22. BCKV, Kalyani

S.No.	Sample No	DMR Accession Number	Habitat	GPS Data	Identification
01.	BCKV-1350	DMRO-1124	Soil	NA	NA
02.	BCKV-3317	DMRO-1125	Soil	NA	NA
03.	BCKV-3310	DMRO-1126	Soil	NA	NA



23. ICAR-DMR, Solan

Fungal forays were undertaken in the forest areas of Himachal Pradesh. A total number of 203 specimens were collected and 151 were identified up to genus level. All the specimens were examined and preserved in the herbarium

of ICAR-DMR, Solan. The obtained 42 pure cultures were deposited in the Gene bank of DMR, Solan. Some of the interesting specimens including their macroscopic feature in the field along with their photographs were described below.



Fig. 5.20. Germplasm collected by Solan centre



6. EXTENSION ACTIVITIES

Bhubaneswar Centre

Table. 6.1. Three days awareness training conducted

Sl. No.	Date	Venue	No. of participants	Male	Female	Composition of participants
1.	28-30 June	OUAT, Bhubaneswar	32	20	12	Tribal region farmers
2.	5-6 November,	KVK, Kirei, Sundargarh	25	5	20	-
3.	6-7 December	OUAT, Bhubaneswar	15	15	-	-
Total			72	40	32	

Table. 6.2. Five days training conducted

Date of training	Venue	No. of participants	Number of Male participants	Number of Female participants
14-18 May, 2018	OUAT, Bhubaneswar	7	5	2
9-13 July, 2018	OUAT, Bhubaneswar	22	21	1
12-16 November, 2018	OUAT, Bhubaneswar	55	42	13
10-14 December, 2018	OUAT, Bhubaneswar	43	33	10
Total		127	101	26

Table. 6.3. Five days training conducted

Date of training	Venue	No. of participants	Number of Male participants	Number of Female participants
19-28 May, 2018	OUAT, Bhubaneswar	7	5	2
9-18 Aug, 2018	OUAT, Bhubaneswar	28	20	8
18-27 December, 2018	OUAT, Bhubaneswar	31	-	-
Total		66	25	10

Table. 6.4. Coverage in mass media

Sl. No.	Item	Number
1	Participation in exhibitions	02
2	TV programmes	02
3	Radio programmes	-
4	Farmers Scientists exhibition	02
5	News paper coverage	03

Date	Number of farmers/ students	Number of male participants	Number of female participants
9.04.2018	28	8	20
16.04.2018	25	20	5
23.06.2018	50	30	20
25.06.2018	50	10	40
4.07.2018	50	50	0
26.07.2018	100	75	25
3.08.2018	30	5	25
4.08.2018	60	20	40
6.08.2018	25	25	0
10.08.2018	50	38	12
12.08.2018	50	0	50
21.08.2018	100	66	34
1.09.2018	20	20	0
18.09.2018	100	80	20
25.09.2018	50	35	15
28.09.2018	100	65	35
9.10.2018	15	10	5
22.10.2018	100	75	25
26.10.2018	100	60	40
2.11.2018	100	100	0
9.11.2018	15	12	3
29.11.2018	80	50	30
7.12.2018	50	30	20
8.12.2018	30	20	10
15.12.2018	20	20	0
22.12.2018	50	21	29
26.12.2018	40	38	2
28.12.2018	100	90	10
31.12.2018	10	10	0
4.01.2019	20	18	2
17.01.2019	20	20	0
18.01.2019	80	50	30



19.01.2019	25	25	0
22.01.2019	30	20	10
29.01.2019	50	30	20
1.02.2019	50	50	0
2.02.2019	73	63	10
6.02.2019	30	28	2
7.02.2019	35	30	5
8.02.2019	25	20	5
11.02.2019	30	15	15
2.03.2019	36	30	6
6.03.2019	50	4	46
13.03.2019	20	10	10
26.03.2019	31	20	11
Total	2203	1516	687*

*Out of total 2203 numbers of visitors, 687 (31.18%) were female.

Consultancy Provided

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.

Table. 6.5. Visit of dignitaries

Date	Visitors
13.11.2018	: Dr. C. S Shukla, Professor, IGKV, Raipur, Chhatisgarh
14.11.2018	: Dr.V.P.Sharma, Director, ICAR-DMR, Solan
14.11.2018	: Dr. D.S.Rathor, Chairman, QRT
14.11.2018	: Dr.R.P.Tewari,Former Director, ICAR-DMR, Solan
13.03.2019	: ,

Table. 6.6. Spawn supply

Particulars	Species	Supply (Kg/number)
Spawn	-	-
Master spawn	<i>Volvariella volvacea</i>	1470 bottles
	<i>Pleurotus spp</i>	789 bottles
Culture tubes	<i>Volvariella volvacea</i>	14 slants
	<i>Pleurotus spp</i>	7 slants

Experiential learning

- Number of students: 20
- Gender wise distribution: Boys-03 and girls -17

Sl.No.	Seminar/symposia/ workshop	Date	Venue
1	19-26April, 2018	Thematic Research Group Meeting	Biju Pattanaik Hall, OUAT, Bhubaneswar
2	4-5May, 2018	XX Annual Group Meeting	MPUAT, Udaipur
3	27-28 October, 2018	5 th National Symposium on “New Dimensions in Plant Protection-A step towards food and nutritional security and environmental safety.	Biju Pattanaik Hall, OUAT, Bhubaneswar
4	14-15 November, 2018	QRT	CTMRT, OUAT, Bhubaneswar
5	8-9 th January, 2019	National Seminar on “Role of women in Agricultural Production and Marketing”	Biju Pattanaik Hall, OUAT, Bhubaneswar

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 2018-19. These activities are as follows.

Sr.No. Name of the training		Date of training	No. of Participants		
			Male	Female	Total
1	Oyster & Milky Mushroom	07.04.2018	40	11	51
2	Cultivation Training Programme	11.05.2018	17	05	22
3		02.06.2018	37	06	43
4		07.07.2018	32	06	38
5		04.08.2018	42	08	50
6		01.09.2018	43	12	55
7		06.10.2018	48	13	61
8		03.11.2018	29	06	35
9		01.12.2018	35	05	40
10		05.01.2019	48	08	56
11		02.02.2019	43	04	47
12		02.03.2019	43	14	53
13		05.04.2019	26	05	31
14		04-05-2019	30	05	35
15		01-06-2019	23	07	30
Total			536	111	647



Mushroom cultivation and Spawn production trainings

To transfer the technology of mushroom cultivation, fifteen (15) one day training programmes (Table 6.8) on oyster and milky mushroom cultivation technology, four (4) three

days training on spawn production technology (Table 6.9) and 3 five days training programme on button mushroom cultivation technology were conducted by the scientists of this project. Total 705 trainees participated in these trainings of which 585 and 120 were male and female participants, respectively.

Table 6.9. Three days trainings conducted

Sr.No.	Name of the training	Date of training	No. of Participants		
			Male	Female	Total
1	Mushroom spawn production technology	27.06.2018 to 29.06.2018	07	0	07
2		29.10.2018 to 31.10.2018	10	0	10
3		17-01-2019 to 19-01-2019	08	01	09
4		08-04-2019 to 10-04-2019	03	0	03
Total		28	01	29	

Table 6.10. Five days trainings conducted

Sr.No.	Name of the training	Date of training	No. of Participants		
			Male	Female	Total
1	Button mushroom cultivation technology	22.10.2018 to 26.10.2018	09	01	10
2		21.01.2019 to 25.01.2019	06	03	09
3		08-04-2019 to 12-04-2019	06	04	10
Total			21	08	29
Grant Total			585	120	705

Table 6.11. Coverage in mass media

Sr. No.	Activity	Number
1	Participation in Agril. Exhibitions	05
2	TV Programme	-
3	Radio Programmes	05
4	Farmers scientists exhibitions	
	a. Brain Storming session on scientist farmer interface	
	b. Mushroom day celebration	01 01
5	News paper coverage	07

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 various agencies at different places (Table 6.11).

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 various agencies at different places. Participated with live demonstrations in following programmes

Table 6.12. Important visitors

Sr.No.	Visitors	Date
1	Farmers (10) from Fiji Sugar Corporation Ltd., Fiji	25.01.2019
2	Shri. Kolase Patil, Ex-Judge-High Court, and Dr. K.P. Vishwanatha, Hon. Vice Chancellor, MPKV, Rahuri visited Mushroom demonstration stall during “Rabi Krushi Mahotsav-2019” at College of Agriculture, Pune	08.02.2019
3	Farmers from Shashwat NGO, Ahmedabad, Gujrat	13.02.2019.
4	Progressive farmers of ATMA, Port Blair, Andaman & Nicobar Island	15.03.2019

1. Exhibited mushroom cultivation technology in Agri-Tech Fest-2018 at College of Agriculture, Pune on 18th September, 2018.

Table 6.13. Exposure visit of Farmers

Sr.No.	State	State wise Number of farmers/ students	Gender-wise distribution	
			Male	Female
1.	Maharashtra	11563	8940	2623
2.	Gujrat	67	67	-
3.	Madhya Pradesh	23	18	5
4.	Karnataka	40	40	-
5.	Port Blair	10	10	-
6	Fiji	10	10	-
7	Urugve, Mangolia, Zimbabwe, Afganistan	30	30	-
Total		11743	9115	2628

Consultancy /Guidance Provided during 2018-19

Table 6.14. On Farm guidance

1	Dr. A. C. Jadhav and Shri. N.G. Desai	Southern Konkan area during 6-8 Aug, 2018
2	Dr. A. P. Gaikwad and Shri. N. G. Desai	Dist- Latur ,21 Aug, 2018,
3	Dr. A. C. Jadhav and Shri. N.G. Desai	Northen Konkan area -1-4 Oct, 2018,
4	Dr. A. P. Gaikwad and Shri. N. G. Desai	5-6 Nov, 2018 in Pune district along with Dr. V. P. Sharma, Director, DMR, Solan and scientists from AICRP Pune centre
5	Mrs. M.C. Dhavale	Bhuta Agro Bio-Tech, Medha, Dist-Satara: 04.02.2019
6	Dr. A. P. Gaikwad and Shri. N.G. Desai	Satara, Sangli and Kolhapur districts : 27 th Feb, 2019
7	Dr. A. P. Gaikwad and Shri. N.G. Desai	Navin Fresh Mushroom, Fursungi, Pune 13.03.2019
8	Dr. A. C. Jadhav and Shri. N.G. Desai	District Kolhapur: 21 st May, 2019
II) Consultancy /Guidance Provided during visit to the Centre / telephone		
All staff members		Consultancy /Guidance service provided to 3354 farmers



Table 6.15. Visit of dignitaries

Sr. No.	Name of dignitaries	Date of visit
1	Dr. R.V.S. Rao, Principal Scientists, ICAR, NAARM, Hyderabad	02.05.2018
2	Dr. Kong Vannak, Dean-Faculty of Agriculture and food processing, Mean Chey University, Cambodia	27.06.2018
3	Dr. Ashish Polkade and Dr. Rohit Sharma, Scientists, NCMR-NCCS, Pune:	12.09.2018
4	Dr. Jeanette M. Haley & Dewa Haley, Nityanand Education Trust, Palghar:	29.09.2018
5	Dr. V.P.Sharma, Director & Project Coordinator, Directorate of Mushroom Research, Solan (HP)	05-06.11.2018
6	QRT: Hon. Dr. D.S. Rahtore, Chairman,Dr. Tewari, Member, andDr. B.L. Attri, Member Secretary, visited to AICRPM, Pune Centre on for monitoring and reviewing the research and extension activities of the centre for the period of 2012-13 to 2016-17	15-17.11.2018
7	Dr. P.S. Pandey, ADG, Education, ICAR, New Delhi	30.11.2018
8	Dr. V.K. Gupta, Principal Scientist, CPRIC, Modipuram, Meerut, UP	27.12.2018
9	Dr. K.V. Prabhu, Chairperson, PPV and FRA, New Delhi	30.01.2019
10	Dr. M.B. Varbhuvan, DG, MCAER, Pune	28.03.2019
11	Dr. S.D. Sawant, Hon. Vice Chancellor, Dr. BSKKV, Dapoli, Dist-Ratnagir	05.04.2019

Table 6.16. Spawn supply

Sr. No.	Species wise/ mushroom wise spawn supply	Master spawn sold	Culture tubes sold
1	<i>Pleurotus sajor caju</i> =2.061 MT	-	-
2	<i>Hipsizygus ulmarius</i> = 0.601 MT	-	-
3	<i>Pleurotus florida</i> = 0.172 MT	-	-
4	<i>Pleurotus eous</i> = 0.029 MT	-	-

Table 6.17. Experiential learning

Sr. No.	Number of students	Gender wise distribution	
		Male	Female
1	28	14	14

Table 6.18. Participation in seminar/symposia/workshop, etc.

Sr. No.	Name of staff members	Workshop/symposia/ Seminar/Training	Venue	Date
1	Dr. A. P. Gaikwad, Dr. A. C. Jadhav and Mr. N. G. Desai	XX Annual Workshop of AICRP on Mushroom	MPUAST, Udaipur, Rajsthan.	4 to 6 th , May 2018
2	All staff of Centre	Meeting for formation of Mushroom Growers Association and also discussed of problems faced by the growers.	AICRP on Mushroom, College of Agriculture, Pune	16 th June, 2018

Sr. No.	Name of staff members	Workshop/symposia/ Seminar/Training	Venue	Date
3	Dr. A.P. Gaikwad, Mrs. M.C. Dhavale and Shri. N.G. Desai	National Symposium on “Trends and Innovations in mushroom Production Technologies, Diversification, Processing and Consumption”	HAIC, R & D Centre, Murthal, Haryana	31 st Jan. to 2 nd Feb, 2019.



Fig. 6.1. Oyster & Milky Mushroom Cultivation Training Programme organized at Pune Centre



Fig. 6.2. Demonstration of oyster mushroom cultivation technology at Pune Centre



Fig. 6.3. Dr. V. P. Sharma, Director, DMR, Solan along with scientists from Pune Centre to M/s. Balaji Agro Products Pvt. Ltd, Baramati, Pune on 05.11.2018



Fig. 6.4. Shri. Kolase Patil, Ex-Judge-High Court, and Dr. K.P. Vishwanatha, Hon. Vice Chancellor, MPKV, Rahuri visited Mushroom demonstration stall during “Rabi Krushi Mahotsav-2019” at College of Agriculture, Pune on 08.02.2019

Fig. 6.5. QRT: Hon. Dr. D.S. Rahtore, Chairman, Dr. Tewari, Member, and Dr. B.L. Attri, Member Secretary, visited private mushroom farms during 15-17 Nov, 2018



Raipur Centre

Table 6.19. One day Mushroom Training on “Mushroom Production and Processing Technology”

Date	No. of Participants	Male	Female
28.04.2018	12	0	12
26.05.2018	27	02	29
29.06.2018	09	0	09
28.07.2018			78
25.08.2018	39	07	46
22.09.2018	33	36	69
27.10.2018	43	04	47
24.11.2018	15	01	16
22.12.2018	12	01	13
25.01.2019	15	0	15
23.02.2019	21	20	41
Total			

Table 6.20. Three day Training (Mushroom Production and Processing) at Raipur

Date	Male Participants	Female Participants	Total
29.03.2019 to 31.03.2019	25	15	40

Table 6.21. Five days Training (Mushroom Production and Processing)

Date	Male Participants	Female Participants	Total
17.09.2018 to 21.09.2018 at Kukera Village, Raipur	00	80	80
04.02.2019 to 08.02.2019 at Jagdishpur Basna, Mahasamund	05	60	65

Table 6.22. Five days Training (Mushroom Spawn Production Technology) at Raipur

Date	Male Participants	Female Participants	Total
17.08.2018 to 21.08.2018	44	06	46

Table 6.23. Two hundred Hours (200 Hours) PMKVY Training Mushroom Grower (Small Entrepreneur)

Date	Male Participants	Female Participants	Total
15.03.2019 to 25.04.2019 at Raipur	06	18	24

Table 6.24. Seven days Hands on Training to NSS Volunteers State Level Camp at Raipur

Date	Male Participants	Female Participants	Total
15.06.2018 to 21.06.2018 at Raipur	278	324	602



Participations in Exhibitions, Kisan Mela and Mushroom Day (Display of Exhibits, live demonstrations and free distribution of mushroom information leaflets)

- Two days Exhibition on Special National Symposium on Extension Plant Pathology, IPS at Raipur on 24.09.2018 to 25.08.2018. : 254 delegates and more than 1000 farmers
- Mushroom Day Observed on 23.12.2019. 70 school students and 14 farmers attended.
- Five days exhibitions through mushroom stalls in COSMOS Fair: 26.12.2018 to 30.12.2018
- Two days exhibition in Flower show at Raipur: 14.01.2019 to 15.01.2019
- Five days display of exhibits in Eighth Indian Horticulture Congress 18.02.2019 to 22.02.2019
- Five days Kissan Mela at Bemetra, CG from 22.02.2018 to 25.08.2019: Live demonstrations, Hands on training were imparted to more than 5000 farmers

Participations in Workshops/ Seminar / Conferences

- Attended Annual Workshop of AICRP Mushroom on 04.05.2018 to 05.05.2018: Dr C. S. Shukla and Shri H. K. Singh
- Attended Training Program on Developing Business Proposal for Darmer's Producer Company from 06.08.2018 to 10.08.2019: Shri H. K. Singh
- Participated in Special National Symposium on Extension Plant Pathology 24.09.2018 to 25.09.2018
 - o Best Exhibition Stall
 - o Best Oral presentation: Harvinder Kumar Singh

o Best Poster Presentation:

- § First Prize: Anurag Kerketta, C. S. Shukla and H. K. Singh
- § Second Prize: Upendra Nag, C. S. Shukla and H. K. Singh, Varsha Kerketta, C. S. Shukla and H. K. Singh

- Attended training at ATARI Kanpur 17.12.2018 to 19.12.2018 Master Trainer Training for Domain Mushroom Grower for organising PMKVY training
- Organised Startup-Samvaad and Workshop on Innovations, Start-ups and Entrepreneurship in collaboration with NAARM on 28.12.2018
- Attended 13th Biennial Conference on Entrepreneurship at EDII Ahmedabad from 20.02.2019 to 22.02.2019: Invited Lecture delivered by Shri H. K. Singh

Visit of Dignitaries

- Shri Bhupesh Bhaghel, Honourable Chief Minister on 18.02.2019
- Shri Ravindra Choubey, Honourable Agriculture Minister on 19.02.2019
- Shri Ajay Singh, Ex APC CG
- Dr. S. K. Patil. HVC, IGKV Raipur
- Dr. A. K. Singh, DDG Agriculture Extension on 24.09.2018
- Dr. C. Manoharachary, Ex. ASRB Chairman on 24.09.2018
- Dr. V. K. Baranwal, Professor Division of Plant Pathology, IARI 24.09.2018
- Dr. Pratibha Sharma, Ex Professor Division of Plant Pathology, IARI 24.09.2018
- Dr. C. Chhattopadhyaya, HVC BCKV on 24.09.2018



- Dr. Om Gupta, Dean College of Agriculture JNKVV Jabalpur on 24.09.2018
- Dr. S. S. Chahal, VC Khalsa University, Former VC MPUAT, Udaipur on 24.09.2018
- Dr. V. P. Sharma, Director DMR Solan
- Dr B. Vijay, Ex. Principal Scientist, DMR Solan

Experiential Learning

- No. of Students: 31
- Post graduate teaching
- Mushroom Production Technology: PL-PATH 517: 33 students

Table 6.25. Spawn/mother spawn/cultures/ready to fruit bags supply

Patriculars	Spawn	Mother spawn	Culture Tube
Total	2.88 Tonnes	238	112



Fig. 6.6. Visit of Dr. A. K. Singh DDG Agriculture Extension ICAR



Fig. 6.7. Dr. V. P. Sharma Director DMR Solan



Fig. 6.8. University Accreditation Team of ICAR and Shri T. S. Singh Dev Honourable Minister Visiting Ambikapur Low Cost Button mushroom Units



Fig. 6.9. Some newspaper clipping from Raipur

Nauni Centre

Table 6.26. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
27/10/18	10	10	NIL

Table 6.27. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
22/3/19 to 26/3/19.	12	9	3

Table 6.28. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
4-8 Sep.2018	30	30	NIL
10-15 Sep.2018	45	30	15
26 Nov- 1 Dec. 2018	20	9	11



Table 6.29. Coverage in mass media

1.	Participation in exhibitions	4
2.	TV programmes	1
3.	Radio programmes	-
4.	Farmers Scientists exhibition	5
5.	News paper coverage	2

Experiential learning

- Number of student- 33
- Gender wise distribution- 15 M 18F

Table 6.30. Exposure visit of Farmers

Date	Number of farmers/ students	Number of male participants	Number of female participants
21/6/18	1	45	
29/6/18	1	25	
20/8/18	1	30	
30/8/18	1	30	
4/9/18	1	30	
5/9/18	1	30	
11/9/18	1	20	5
12/9/18	1	30	15
26/9/18	1	25	
4/10/18	1	21	4
27/10/18	1	10	
13/11/18	1	20	
22/11/18	1	45	
26/11/18	1	9	11
10/1/19	1	20	5

Table 6.31. Spawn supply

Item	Species	Supply (Kg/number)
spawn	<i>A.bisporus</i> , Pleurotus, Shiitake	3780 Kg
Master spawn	-	
Culture tubes	-	

Participation in seminar/symposia/
workshop etc

- 1) Attended XX annual workshop of AICRP (Mushroom) at MPUAST- Udaipur w.e.f. 4-5 May 2018.
- 2) Attended two days workshop cum review meeting of Experiential Learning Units w.e.f. 25-26 May 2018 at UHF, Nauni, Solan
- 3) Participated in the Launch Workshop of DST sponsored project “Studies on improving livelihood generation through scientific interventions in *Pinus gerardiana* and important wild mushrooms in Himachal Pradesh on 23 June 2018 at Hotel Holiday Home, Shimla



Fig. 6.10. Trainings organized at Nauni Centre



Fig. 6.11. Demonstration organized by Nauni Centre

Murthal

Table. 6.32. Four day training programmes organised at HAIC, Murthal Centre

Sr. no.	Date	Trainees	Batch	Sr. no.	Date	Trainees	Batch
1	25/4/18 to 28/04/18	29	231	15	24/10/18 to 27/10/18	39	245
2	08/05/18 to 11/05/18	40	232	16	30/10/18 to 03/11/18	53	246
3	16/05/18 to 19/05/18	46	233	17	27/11/18 to 01/12/18	48	247
4	23/05/18 to 26/05/18	34	234	18	04/12/18 to 08/12/18	38	248
5	30/05/18 to 02/06/18	43	235	19	11/12/18 to 15/12/18	45	249
6	06/06/18 to 09/06/18	36	236	20	18/12/18 to 22/12/18	65	250
7	10/07/18 to 14/07/18	45	237	21	02/1/19 to 06/1/19	22	251
8	18/07/18 to 21/07/18	49	238	22	10/2/19 to 14/2/19	46	252
9	08/08/18 to 11/08/18	43	239	23	19/2/19 to 23/2/19	69	253
10	22/08/18 to 25/08/18	48	240	24	26/2/19 to 02/3/19	35	254
11	05/09/18 to 08/09/18	58	241	25	05/3/19 to 09/3/19	38	255
12	18/09/18 to 22/09/18	44	242	26	13/3/19 to 16/3/19	29	256
13	03/10/18 to 07/10/18	56	243	27	25/3/19 to 28/3/19	51	257
14	16/10/18 to 20/10/18	48	244	Total		1197	



Spawn supply

Table 6.33. Spawn, compost and Casing soil supplied to growers by HAIC, Murthal Centre

Sr. no.	Month	Spawn (kg)	Compost (kg)	Casing Soil (kg)
1	April	15083	19042	252
2	May	15128	2274	290
3	June	17385	5851	317
4	July	19446	8380	1077
5	August	13154	6495	1665
6	September	13803	1658	750
7	October	26915	49470	638
8	November	21762	162303	20544
9	December	20665	132635	15084
10	January	10865	42866	8021
11	February	5043	20247	4337
12	March	9983	2390	22
Total		189232	453611	52997



Fig. 6.12. Mushroom Day Celebration at HAIC, Murthal



Fig. 6.13. Sh. Rajiv Jain, Media Incharge, Chief Minister, Haryana



Fig. 6.14. Sh. Bharat Kumar, DCM, Embassy of Nepal



Fig. 6.15. Dr. Rajendrakumar Anayath, Vice Chancellor, DCRUST



Fig. 6.16. National mushroom day celebration



Fig. 6.17. Organized three days National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing & Consumption

Pusa Centre

Table 6.34. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
08.04.2018	350	93	257
11.04.2018	39	00	39
22.05.2018	210	60	150
04.06.2018	24	13	11
09.06.2017	30	00	30
17.07.2018	26	08	18
30.08.2018			
02.09.2019	114	114	0
24.10.2018	21	08	13
25.10.2018	34	15	19
28.10.2018	27	27	00
18.11.2018	126	126	0
21.11.2018	30	30	00
27.11.2018	82	56	26
13.12.2018	21	21	00
27.12.2018	119	82	37
03.03.2019	36	12	24
14.03.2019	57	34	23



Table 6.35. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
24-26 May, 2018	12	67	79
13-17 July, 2018	34	06	40
28-29 March, 2019	25	90	115

Table 6.36. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
9-15 May, 2018	16	37	53
4-10 June, 2018	01	02	03
22-28 June, 2018	05	23	28
18-24 July, 2018	03	00	03
6-12 September, 2018	16	10	26
12-18 September, 2018	35	07	42
26 September to 02 October, 2018	13	05	18
26 September to 02 October, 2018 (Dibyang)	14	05	19
08 October to 14 October, 2018	10	05	15
26 October to 02 November, 2018	36	02	38
21-27 January, 2019	17	05	22
12-18 February, 2019	17	15	32
18-24 February, 2019	00	04	04
28 June to 12 July, 2018	07	01	08
21 December 2018 to 4 January 2019	26	16	42
15-29 March, 2019	06	03	09
24 July to 25 August, 2018	04	00	04

Table 6.37. Coverage in mass media

1.	Participation in exhibitions	
2.	TV programmes	04
3.	Radio programmes	
4.	Farmers Scientists exhibition	04
5.	News paper coverage	137

Date	Number of farmers/students	Number of male participants	Number of female participants
2018-19	4500	2537	1963

Name of Visitor	Designation	Date of Visit
Dr. Shwet Kamal	P.S. DMR, Solan	28-29 March, 2019
Smt. Harpreet Kaur, IPS	S.P., Samastipur	8.11.2018
Sri Manoj Kumar Singh	Principal Judge, Muzaffarpur	04.02.2019
Dr. D.S. Rathore, Dr. R.P. Tiwari and Dr. Shwet Kamal	QRT Members	27-28 November, 2018
British High Commissioner		07.0.3.2019

Item	Species	Supply (Kg/number)
spawn	Oyster, Button & Milky	7800 Kg.
Master spawn	Oyster, Button & Milky	4473 bottle (300g each)
Culture tubes	-	

Table. 6.41. fcgkj ei e'k:e mRiknu dk;Øe lekpi i=k dh utj ei %2018&19%

क्र.सं.	विषय	स्थान	दिनांक	पृष्ठ सं.
1.	बने उद्यमी अभियान कार्यशाला का आयोजन मशरूम उत्पादन तकनीकी पर दिया गया प्रशिक्षण	अनंत भारत	10 अप्रैल, 2018	06
2.	बेरोजगारी और कुपोषण से मुक्ति दिला सकता है मशरूम : कुलपति	दैनिक जागरण	10 अप्रैल, 2018	02
3.	मशरूम उत्पादन की महत्वाकांक्षी योजना तैयार	प्रातःकाल	16 अप्रैल, 2018	02
4.	मशरूम उत्पादन कर मधुबनी व सीतामढ़ी जिले के आदिवासी परिवार बने सबल : दयाराम	दैनिक भास्कर	20 अप्रैल, 2018	16
5.	मशरूम की खेती से बहुरेगें आदिवासी समाज के दिन	दैनिक जागरण	21 अप्रैल, 2018	04
6.	खेती किसानों के क्षेत्र में 26 बिलियन डालर खर्च करेगी राज्य सरकार : आयुक्त	दैनिक भास्कर	26 अप्रैल, 2018	14
7.	कुल बजट का 20 प्रतिशत खर्च होगा कृषि पर : ए.पी.सी.	हिन्दुस्तान	26 अप्रैल, 2018	06
8.	डेरम में सफेद मशरूम के बाद अब गुलाबी मशरूम की हो रही खेती	दैनिक जागरण	01 मई, 2018	12
9.	मशरूम उत्पादन कर आदिवासी महिलायें बन रही स्वावलंबी	दैनिक जागरण	08 मई, 2018	04
10.	बिहार में तेजी से बढ़ रहा है मशरूम उत्पादन : निदेशक	दैनिक जागरण	10 मई, 2018	04
11.	मशरूम बिना खेत के खेती का बेहतर विकल्प : डा0 मिथिलेश	हिन्दुस्तान	10 मई, 2018	05



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12. अल्प भूमि वाले आदिवासी किसानों के लिये मशरूम एक बेहतर विकल्प : डा0 मिथिलेश	दैनिक भास्कर	10 मई, 2018	12
13. मशरूम उत्पादन कर किसान बन सकते हैं आत्मनिर्भर : डा0 दयाराम	दैनिक भास्कर	14 मई, 2018	09
14. आर्थिक समृद्धि का श्रोत बनकर आ रहा है मशरूम	हिन्दुस्तान	16 मई, 2018	06
15. लघुस्तरीय मशरूम उत्पादन लाभकारी	प्रभात खबर	16 मई, 2018	04
16. मशरूम से जुड़े उत्पादों को बाजार में उतारेगा कृषि विवि	दैनिक भास्कर	16 मई, 2018	14
17. मशरूम की खेती से अच्छी आमदनी	हिन्दुस्तान	16 मई, 2018	09
18. मशरूम गरीबी व कुपोषण दूर करने का सशक्त माध्यम : डा0 दयाराम	राष्ट्रीय सहारा	16 मई, 2018	05
19. अब मशरूम के बिस्किट व समोसे	हिन्दुस्तान	17 मई, 2018	06
20. कुपोषण दूर करने में मशरूम उपयोगी	प्रभात खबर	25 मई, 2018	06
21. मशरूम उत्पादन से ही आर्थिक समृद्धि : डा0 सिंह	दैनिक जागरण	25 मई, 2018	02
22. मशरूम उत्पादन करने में महिलायें अग्रणी : डा0 सिंह		25 मई, 2018	14
23. मशरूम के क्षेत्र में महिलाओं की बढ़ रही भागीदारी	हिन्दुस्तान	25 मई, 2018	08
24. सामाजिक आर्थिक विकास का श्रोत के रूप में उभर रहा मशरूम	हिन्दुस्तान	27 मई, 2018	06
25. मशरूम गरीबी रेखा से उपर आने में सहायक	प्रभात खबर	27 मई, 2018	02
26. राजेन्द्र पूसा हनी व मशरूम होगा विवि का ब्राण्ड	दैनिक जागरण	14 जून, 2018	04
27. एम.बी.ए., एम.टेक व बी.टेक कर रहे छात्रों ने दिखाई रुचि	राष्ट्रीय सहारा	23 जून, 2018	11
28. मशरूम उत्पादन आर्थिक स्वावलंबन के अलावा सेहत का बेहतर पर्याय : दयाराम	दैनिक भास्कर	23 जून, 2018	14
29. औषधीय गुणों से परिपूर्ण है मशरूम	हिन्दुस्तान	23 जून, 2018	06
30. सामाजिक-आर्थिक विकास में मशरूम हो रहा है सहायक : डीन	हिन्दुस्तान	24 जून, 2018	08
31. बिहार की जलवायु मशरूम उत्पादन को सालोभर उपयुक्त	दैनिक जागरण	29 जून, 2018	06
32. घर की थालियों से लेकर पांच सितारा होटल तक परोसा जाने लगा मशरूम	दैनिक भास्कर	29 जून, 2018	12
33. मशरूम किसी परिचय का मोहताज नहीं	प्रभात खबर	29 जून, 2018	09
34. पांच सितारा होटलों की शान बना मशरूम	राष्ट्रीय सहारा	29 जून, 2018	04
35. हर गाँव में मशरूम मशरूम का	प्रभात खबर	2 जुलाई, 2018	02
36. गाँ-गाँव जगेगी मशरूम की अलख : डा0 दयाराम	दैनिक भास्कर	2 जुलाई, 2018	12
37. उच्च गुणवत्तायुक्त प्रोटीन का बेहतर विकल्प है मशरूम	हिन्दुस्तान	5 जुलाई, 2018	04
38. विवि में खुला मशरूम उत्पाद विक्रय केन्द्र	प्रभात खबर	12 जुलाई, 2018	05
39. मशरूम सब्जी व दाल का विकल्प : डीन	प्रभात खबर	14 जुलाई, 2018	06
40. मशरूम औषधीय गुणों से भी परिपूर्ण	हिन्दुस्तान	14 जुलाई, 2018	06
41. Goan mushroom can aid fight against cancer	The Times of India, Patna	17 July, 2018	



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42. एम.आर.एम. महाविद्यालय में दिया गया मशरूम उत्पादन का प्रशिक्षण		18 जुलाई, 2018	
43. छात्राओं को मिला मशरूम उत्पादन का प्रशिक्षण		18 जुलाई, 2018	
44. केन्द्रीय कृषि विवि में मशरूम समोसे, बिस्किट व नमकीन बनाने का प्रयोग सफल, आसपास के लोगों में बढ़ी मांग	दैनिक भास्कर	20 जुलाई, 2018	14
45. मशरूम की खेती से बढ़ाएं आमदनी, जलालपुर, जौनपुर, उत्तरप्रदेश	—	—	—
46. मशरूम की खेती से आय बढ़ा सकते हैं किसान, जलालपुर, जौनपुर, उत्तर प्रदेश	—	—	—
47. मशरूम की खेती से किसान कमाएं अब अधिक मुनाफा, जलालपुर, जौनपुर, उत्तर प्रदेश	—	—	—
48. सात विषयों के समावेश से मशरूम ने लिया उद्यम का रूप : डीन	हिन्दुस्तान	26 जुलाई, 2018	04
49. मशरूम उत्पादन के क्षेत्र में किसानों को उद्यमी बनाकर अधिक मुनाफा हासिल करवाना ही है उद्देश्य : डीन	दैनिक भास्कर	26 जुलाई, 2018	14
50. मशरूम उत्पादन से मिलती आर्थिक मजबूती	प्रभात खबर	06 अगस्त, 2018	05
51. बिना जमीन के मुनाफे की खेती है मशरूम	हिन्दुस्तान	06 अगस्त, 2018	04
52. बाजार में उतरा मशरूम का बिस्किट व नमकीन	हिन्दुस्तान	09 अगस्त, 2018	04
53. प्रयोगात्मक प्रशिक्षण ही है इंटरप्रेन्योरशिप का मूलमंत्र	प्रभात खबर	23 अगस्त, 2018	04
54. इंटरप्रेन्योरशिप के उपयोग से क्षमतावान होंगे उद्यमी : डा0 हर्ष	प्रभात खबर	25 अगस्त, 2018	06
55. समय से पहले दोगुनी होगी किसानों की आय	दैनिक जागरण	25 अगस्त, 2018	15
56. मशरूम उत्पादन के क्षेत्र में किसानों को उद्योग करने के लायक बनाकर अधिक मुनाफा हासिल करवाना ही प्रशिक्षण का मूल उद्देश्य : डा0 हर्ष	दैनिक भास्कर	25 अगस्त, 2018	12
57. सूखे मशरूम से किसानों की आय दोगुनी संभव	प्रभात खबर	30 अगस्त, 2018	06
58. मंडल कारा में बंदी करेंगे मशरूम का उत्पादन	हिन्दुस्तान	3 सितम्बर, 2018	06
59. मंडल कारा में बंदी सीख रहे मशरूम उत्पादन की तकनीक	प्रभात खबर	3 सितम्बर, 2018	07
60. सात विषयों के समावेश से मशरूम ने लिया उद्यम का रूप	हिन्दुस्तान	7 सितम्बर, 2018	06
61. सूबे में पचास हजार परिवार कर रहे मशरूम का उत्पादन	दैनिक जागरण	7 सितम्बर, 2018	05
62. मशरूम महिलाओं के लिए जीविकोपार्जन का साधन	प्रभात खबर	7 सितम्बर, 2018	06
63. मशरूम उत्पादन में सैद्धांतिक से अधिक महत्वपूर्ण प्रायोगिक प्रशिक्षण	प्रभात खबर	11 सितम्बर, 2018	11
64. अपनी नौकरी की चिंता छोड़ दूसरों को नौकरी देने वाले बनें : कुलपति	दैनिक भास्कर	13 सितम्बर, 2018	14
65. महिला सशक्तीकरण का बेहतर विकल्प है मशरूम : कुलपति	हिन्दुस्तान	13 सितम्बर, 2018	06
66. रोजगार का मुख्य स्रोत बन रहा मशरूम	दैनिक जागरण	13 सितम्बर, 2018	04
67. उद्यमी बनने का महत्वपूर्ण साधन मशरूम : निदेशक	प्रभात खबर	19 सितम्बर, 2018	04
68. बेहतर उद्यमी बनने का अवसर देता है मशरूम	हिन्दुस्तान	19 सितम्बर, 2018	06
69. रोग निवारक भी है मशरूम : डॉ0 दयाराम	सहारा	19 सितम्बर, 2018	
70. सुधा ने पकड़ी कमान तो बदल गई परिवार की तस्वीर	हिन्दुस्तान	23 सितम्बर, 2018	06



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71. प्रतिभा ने मशरूम से दर्जनों परिवारों की जिंदगी में लाई खुशियां।	दैनिक भास्कर	24 सितम्बर, 2018	02
72. मोहन प्रसाद केसरी को मिला प्रोगेसिव मशरूम ग्रावर अवार्ड	हिन्दुस्तान	25 सितम्बर, 2018	06
73. अब मशरूम के सहारे दिव्यांग बनेंगे आत्मनिर्भर	हिन्दुस्तान	27 सितम्बर, 2018	06
74. मशरूम उत्पादन में दिव्यांगों ने बढ़ाया कदम	प्रभात खबर	27 सितम्बर, 2018	06
75. मशरूम की खेती से महिलाएं बन रही हैं आत्मनिर्भर : डीन	दैनिक भास्कर	27 सितम्बर, 2018	14
76. फ़ैल रहा मशरूम का व्यवसाय	दैनिक जागरण	3 अक्टूबर, 2018	06
77. अब यक्ष्मा पीड़ित भी ले रहे मशरूम प्रशिक्षण	हिन्दुस्तान	26 अक्टूबर, 2018	06
78. बाजार में उपलब्ध हुआ मशरूम व्यंजन : डॉ0 कुमार	प्रभात खबर	3 अक्टूबर, 2018	07
79. मशरूम उत्पादन सह प्रसंस्करण प्रशिक्षण का हुआ समापन	हिन्दुस्तान	3 अक्टूबर, 2018	06
80. मशरूम ने दिया लोगों को रोजगार : मिथिलेश	हिन्दुस्तान	9 अक्टूबर, 2018	04
81. पूसा का मशरूम दक्षिण अफ्रीका में दिखाएगा जलवा	दैनिक जागरण	9 अक्टूबर, 2018	03
82. साउथ अफ्रीकन किसान भी मशरूम के दीवाने	प्रभात खबर	9 अक्टूबर, 2018	06
83. मशरूम उत्पादन में कंपोस्ट का स्थान महत्वपूर्ण : डॉ0 मिथिलेश	प्रभात खबर	9 अक्टूबर, 2018	06
84. कम भूमि वालों के लिए मशरूम उत्पादन वरदान	दैनिक भास्कर	9 अक्टूबर, 2018	14
85. बायोप्रोटीन खाद्य पदार्थ में सर्वोत्तम : डॉ0 मिथिलेश	प्रभात खबर	15 अक्टूबर, 2018	04
86. मशरूम की उपयोगिता पर विस्तार से हुई चर्चा	हिन्दुस्तान	15 अक्टूबर, 2018	06
87. कुपोषण व गरीबी से छुटकारा दिलाने में मशरूम की अलग उपयोगिता	दैनिक भास्कर	26 अक्टूबर, 2018	16
88. जलवायु के अनुरूप प्रभेद विकसित करने की जरूरत	प्रभात खबर	26 अक्टूबर, 2018	08
89. व्यवसाय का शक्ल ले रहा मशरूम उत्पादन	प्रभात खबर	27 अक्टूबर, 2018	07
90. आर्थिक सशक्तीकरण का बेहतर विकल्प है मशरूम	हिन्दुस्तान	27 अक्टूबर, 2018	04
91. गांव से लेकर शहर तक रोजगार मुहैया करा रहा मशरूम	दैनिक जागरण	30 अक्टूबर, 2018	18
92. दीक्षांत समारोह की तैयार व सुरक्षा का एसपी ने लिया जायजा (विवि के मशरूम की जानकारी लेती एसपी हरप्रीत कौर व अन्य)	हिन्दुस्तान	01 नवंबर, 2018	06
93. मशरूम की खेती से बदलेगा जीवन (मंडल कारा समस्तीपुर में 162 कैदियों को बटन मशरूम उत्पादन का दिया प्रशिक्षण)	हिन्दुस्तान	19 नवंबर, 2018	08
94. बिहार की मिट्टी व जलवायु विश्व में सर्वोपरि : डॉ0 राठौर	प्रभात खबर	29 नवंबर 2018	04
95. क्यूआरटी टीम ने की परियोजना की समीक्षा	हिन्दुस्तान	29 नवंबर 2018	06
96. मशरूम के व्यंजनों का स्वाद दिलाएगा पूसा विश्वविद्यालय	दैनिक जागरण	11 दिसंबर 2018	04
97. जॉब सीकर नहीं, प्रोवाइडर बनें किसान : कुलपति	प्रभात खबर	22 दिसंबर, 2018	04
98. आज के दौर में जॉब सीकर नहीं, प्रोवाइडर बनें नौजवान	हिन्दुस्तान	22 दिसंबर, 2018	08
99. मशरूम व्यवसाय से जुड़े हैं राज्य के 70 हजार किसान, अब कैंसर व डायबिटीज को काबू करेगी हेरिसीएम	दैनिक भास्कर	22 दिसम्बर, 2018	14
100. औषधीय हेरेशियम मशरूम प्रभेद के ईजाद से उत्पादकों में हर्ष	प्रभात खबर	25 दिसम्बर, 2018	10



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101. मशरूम उत्पादन पर सात दिवसीय प्रशिक्षण शुरू	दैनिक जागरण	22 जनवरी, 2019	05
102. समूह बनाकर करें मशरूम की खेती	हिन्दुस्तान	5 जनवरी, 2019	06
103. मशरूम व्यवसाय को दें कॉरपोरेट शक्ल : चतुर्वेदी	प्रभात खबर	5 जनवरी, 2019	06
104. मशरूम उत्पादन क्रांति को और अधिक गति देने के लिए लोगों को समूह बनाकर कार्य करने की जरूरत	दैनिक भास्कर	5 जनवरी, 2019	16
105. मशरूम उत्पादन से बढ़ रहा है स्वरोजगार : डॉ दयाराम	दैनिक भास्कर	22 जनवरी, 2019	07
106. मशरूम अब आसानी से उगाया जा सकता सालोभर	हिन्दुस्तान	22 जनवरी, 2019	06
107. फार्मर्स प्रोड्यूसर समूह बनाने की आवश्यकता	प्रभात खबर	22 जनवरी, 2019	06
108. उत्पाद को वैल्यू एडिशन की ओर अग्रसर करने की जरूरत : डॉ0 मिथिलेश	प्रभात खबर	28 जनवरी, 2019	04
109. In ‘dry’ Bihar, mushroom farming replaces hooch brewing in tribal pockets	Hindustan Times, Patna	01 February, 2019	
110. मशरूम की खेती के प्रति बढ़ रहा है रुझान	हिन्दुस्तान	01 फरवरी, 2019	06
111. मशरूम का सेवन बीमारियों में लाभदायक	हिन्दुस्तान	5 फरवरी, 2019	06
112. मशरूम ग्रामीण महिलाओं के रोजगार का विकल्प : डॉ दयाराम	प्रभात खबर	5 फरवरी, 2019	07
113. तापमान व नमी की एकरूपता से बेहतर उत्पादन : डॉ मिथिलेश	प्रभातर खबर	13 फरवरी, 2019	05
114. औषधीय गुणों से मशरूम का मार्केट वैल्यू बढ़ा	हिन्दुस्तान	13 फरवरी, 2019	07
115. मशरूम स्वरोजगार के रूप में एक बेहतर विकल्प : कुमार	दैनिक भास्कर	13 फरवरी, 2019	12
116. मशरूम उत्पादन तकनीक में संभावनाओं का विशाल भंडार : डॉ दयाराम	आज	15 फरवरी, 2019	07
117. तकनीकी दिशा में किसानों का विजन बदलने की जरूरत : डॉ कृति	प्रभात खबर	19 फरवरी, 2019	06
118. आरएयू में कृषि यांत्रिकी सहित मशरूम व वर्मी में शुरू किया गया मासिक प्रशिक्षण	प्रभात खबर	28 फरवरी, 2019	02
119. किसानों को दी गई मशरूम की खेती की जानकारी	दैनिक भास्कर	—	—
120. मशरूम उत्पादन में रोजगार के व्यापक अवसर	प्रभात खबर	15 मार्च, 2019	05
121. मशरूम आधारित श्वेत क्रांति की संभावना प्रबल	—	—	—
122. महिलाओं को मशरूम उत्पादन का प्रशिक्षण	हिन्दुस्तान	15 मार्च, 2019	06
123. मशरूम के बेहतर उत्पादन से बनाई पहचान	—	—	—
124. मशरूम के लिए बाजार उपलब्ध करायेगा रोटरी : डॉ0 अमृता	—	—	—
125. मशरूम उत्पादन में भारत चाइना से आगे : श्वेत कमल	प्रभात खबर	30 मार्च, 2019	08
126. रोजगार सृजन का सशक्त माध्यम है मशरूम:वीसी	हिन्दुस्तान	29 मार्च, 2019	06
127. मशरूम उत्पादन रोजगार स जन का बेहतर विकल्प : वीसी	प्रभात खबर	29 मार्च, 2019	06
128. मशरूम उत्पादन के व्यवसाय को अपनाकर आदिवासी समाज के लोग बन रहे स्वावलंबी	दैनिक भास्कर	29 मार्च, 2019	12





Fig. 6.18. Glimpse of training, visit of dinitaries and exhibitions at Pusa centre

Ludhiana Centre

Table 6.42. Trainings organized in PAU, Ludhiana.

Training organised	Venue	Date	Participants
Mushroom training course for rural farmers from Fatehgarh Sahib and Patiala, PAU, Ludhiana organized by Skill upgradation training services, Ludhiana.	PAU, Ludhiana	04.04.2018-06.04.2018	22
Training course on tropical mushroom cultivation for rural farmers, PAU, Ludhiana	PAU, Ludhiana	08.05.2018-09.05.2018	43
Mushroom training course for Horticulture Supervisor trainees, PAU, Ludhiana	PAU, Ludhiana	17.05.2018-18.05.2018	22
Mushroom training to Assistant Professor from KVK Bahawal	PAU, Ludhiana	05.09.2018-06.09.2018	1
Mushroom training course for farmers and farm women	PAU, Ludhiana	11.09.2018-15.09.2018	59



Training organised	Venue	Date	Participants
Mushroom training course for young farmers	PAU, Ludhiana	27.09.2018-28.09.2018	30
Mushroom training to SC farmers under SCSP scheme	Village Aliana, Dist. Fazilka	08.10.2018	35
Mushroom training to SC farmers under SCSP scheme	Village Ucha Bhadla, Dist. Ludhiana	15.10.2018	38
Mushroom training to SC farmers under SCSP scheme	Village Neewan Bhadla, Dist. Ludhiana	17.10.2018	27
Entrepreneurship development program on mushroom cultivation under STRYP	PAMETI, Ludhiana	26.11.2018-01.12.2018	15
Practical training to Faridkot farmers on mushroom cultivation	PAMETI, Ludhiana	13.12.2018	15
Paddy straw based mushroom training course for farmers and farm women	PAMETI, Ludhiana	07.01.2019	12
Mushroom training to SC farmers under SCSP scheme	Sheikh-Daulat, Distt. Ludhiana	11.02.2019	30
Mushroom training course for young farmers 120 th batch on integrated crop production (1.1.19-29.3.19)	PAU, Ludhiana	27.02.201928.02.2019	19
Mushroom training for Skill Development programmer	PAMETI, Ludhiana	18.03.2019	30
Mushroom training to SC farmers under SC sub plan scheme in collaboration with DMR Solan	Village Fatehgarh Neewan, Fatehgarh Sahib	27.03.2019	50

Table 6.43. Exhibitions at PAU, Ludhiana

Date	Particulars of Exhibition and the event	Place of Exhibition	Products exhibition	Display
10.05.18	Research and Extension specialists workshop for vegetables, floriculture, sericulture along with post-harvest management, farm power and machinery, food technology and agri-economics	PAU, Ludhiana	Mushroom, vinegar, beverages and Biofertilizers	Live/ Charts
16.05.18	Exhibition at Food convention-Conference on trends, challenges and opportunities in Agro and food processing industry in Punjab	PAU, Ludhiana	Mushroom, vinegar, beverages and Biofertilizers	Live/ Charts
16.08.18	Research and Extension specialists workshop for Rabi crops	PAU, Ludhiana	Mushroom, vinegar, beverages and Biofertilizers	Live/ Charts

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Table 6.44. Lectures Delivered

Sr.No.	Event	Date	Venue
1.	Cultivation of medicinal mushrooms at PAU Kisan Club Meet	02.8.2018	Wheat Auditorium, PAU, Ludhiana
2.	Lecture on processing of mushrooms	08.08.2018	COAE, PAU, Ludhiana
3.	Use of paddy straw for the cultivation of mushrooms	23.8.2018	KVK, Kapurthala
4.	Rice residue management	31.08.2018	PAMETI, Ludhiana
5.	Paddy straw based mushroom compost	05.09.2018	PAMETI, Ludhiana
6.	Use paddy straw for mushroom cultivation in Punjab	07.09.2018	PAMETI, Ludhiana
7.	Paddy straw based mushroom compost in rice residue management	10.09.2018	PAMETI, Ludhiana
8.	Use of paddy straw for the cultivation of mushrooms	14.09.2018	PAMETI, Ludhiana
9.	Lecture on mushroom production on paddy straw for State Govt. Agri. Deptt. Extension functionaries	25.09.2018	PAMETI, Ludhiana
10.	Use paddy straw for mushroom cultivation in Punjab	03.10.2018	PAMETI, Ludhiana
11.	Importance of mushroom cultivation and method of preparation of compost	19.12.2018	KKG, PAU, Ludhiana
12.	Cultivation of mushrooms and its processing	19.12.2018	COAE, PAU, Ludhiana
13.	Cultivation of Dhingri	21.12.2018	KKG, PAU, Ludhiana
14.	Processing of mushrooms	15.01.2019	KKG, PAU, Ludhiana
15.	Composting of mushrooms	16.01.2019	Mushroom Farm, PAU, Ludhiana
16.	Paddy straw management workshop – use paddy straw for cultivation of mushrooms	25.01.2019	Jacob Hall, PAU, Ludhiana
17.	Use of paddy straw in cultivation of specialty mushrooms in Punjab at HDO workshop	06.02.2019	Pal Auditorium, PAU, Ludhiana
18.	Lecture on mushroom production in Punjab using paddy straw to the Agri Extn Service Providers under skill development program (25 Feb to 27 March, 2019)	18.03.2019	Mushroom Farm, PAU, Ludhiana

Table 6.45. T V Talk

Sr. No.	Topic	Name of Expert	Date of Recording/Telecast/Broadcast	Location
1	Khumban di kasht	Dr. S. Kapoor	23.08.18	Doordarshan, Jalandhar

Table 6.46. Radio Talk

Sr. No.	Topic	Name of Expert	Date of Recording/Telecast/Broadcast	Location
1.	Parali Di Varton, Khumban Di Kasht	Dr. S. Kapoor	11.04.18	AIR, Jalandhar
2.	Khumban di kasht	Dr. H. S. Sodhi	17.08.18	AIR, Jalandhar
3.	Garmi Rutt dian khumban di kasht	Dr. Shivani Sharma	25.02.19	AIR, Jalandhar

Table 6.47. Sale of Seed

Name of crop/variety	Quantity (kg)	Amount (Rs.)
Mushroom spawn/bags/mushrooms	3427 kg spawn, 4974 bags, 490 kg mushrooms	5,71,860

Table 6.48. Detail of VIPs visits conducted

Date	Place	Purpose	Name & address of dignitaries
16.04.2018	Mushroom Research Center, PAU	Mushroom as a subsidiary occupation, a possible collaboration	Officials from the Ministry of Agri., irrigation and live stock, Kabul, Govt of Afganistan
14.09.2018	Mushroom Research Center, PAU	AICRP centre	Dr VP Sharma, Director, DMR, Solan
02.12.2018	Mushroom Research Center, PAU	QRT team for AICRP Mushrooms	Dr DS Rathore, DR SR Bhat and Dr S Kamal
13.02.2019	Mushroom Research Center, PAU	Visit	Dr. V. Damodara Naidu, Vice Chancellor, Acharya NG Ranga Agricultural University, AP

Table 6.49. Visit of Mushroom Research Center

08.04.2018	Visit of Mushroom Research Center, PAU by the students of College of Agriculture, Lalsot	9G, 39B
16.04.2018	Visit of Mushroom Research Center, PAU by the officials from the Ministry of Agri., irrigation and livestock, Kabul, Govt of Afganistan	08
23.05.2018	Exposure visit of Mushroom Research Center, PAU by mushroom trainees from KVK, Barnala	20
25.07.2018	Visit of Mushroom Research Center, PAU by farmers from Agri-Clinic and Agri Business Centre scheme organized by ATMA, Faridkot	13
27.07.2018	Visit of Mushroom Research Center, PAU by farmers from Alwar (Rajasthan)	50
14.08.2018	Visit of Mushroom Research Center, PAU by students from Bisra Agri. Univ., Ranchi, Jharkhand	14B, 21G2 faculty
05.09.2018	Visit of Mushroom Research Center, PAU by students from S Thngapazham Agr. College, Vasudevanallae	54
05.09.2018	Visit of Mushroom Research Center, PAU by the participants of ICAR sponsored course on proteomics and its application in agriculture	15
25.09.2018	Visit of Mushroom Research Center, PAU by students from College of Agriculture, GKVK, UAS, Bangalore (Batch II)	22 B, 29 G, 3 faculty
27.09.2018	Visit of Mushroom Research Center, PAU by students from College of Agriculture, GKVK, UAS, Bangalore (Batch I)	37 B, 20 G, 3 faculty
06.10.2018	Visit of Mushroom Research Center, PAU by students from University of Horticultural Scienc, Bagalkot, Karnataka	11 B, 14 G, 3 faculty
08.10.2018	Visit of Mushroom Research Center, PAU by students from CoA, Aland, Karnatka	37B, 27G3 faculty
08.10.2018	Visit of Mushroom Research Center, PAU by students from CoA and Res. Station, Rajnandaon, IGKV, Raipur	23B, 17G3 faculty
11.10.2018	Visit of Mushroom Research Center, PAU by farmers from KVK Bahawal	10
12.10.2018	Visit of Mushroom Research Center, PAU by farmers from KVK Samrala,	25



17.10.2018	Visit of Mushroom Research Center, PAU by students from CoA, Bheemarayaangudi, UAS, Raichur	60B,33G4 faculty
27.10.2018	Visit of Mushroom Research Center, PAU by students from COA, UAS, Raichur	97, 3 faculty
30.10.2018	Visit of Mushroom Research Center, PAU by students from Baba Farid Group of Institution, Bathinda	31B2 faculty
30.10.2018	Visit of Mushroom Research Center, PAU by students from UAS, College of Agriculture, Hanumanamatti	48, 2 faculty
12.11.2018	Visit of Mushroom Research Center, PAU by students from Montana Resource Education and Agri. Leadership Group, Montana, USA	20
13.11.2018	Visit of Mushroom Research Center, PAU by participants from the Winter School organized by the Department of Fruit Science, PAU, Ludhiana	15
20.11.2018	Visit of Mushroom Research Center, PAU by students from Kerala Agricultural University	14B, 36G, 2 faculty
27.11.2018	Visit of Mushroom Research Center, PAU by farmers from Odisha	20
28.11.2018	Visit of Mushroom Research Center, PAU by farmers from Rajasthan	30
29.11.2018	Visit of Mushroom Research Center, PAU by students from College of Horticulture Vellanikkara, KAU, Kerala	35B, 48G, 4 faculty
30.11.2018	Visit of Mushroom Research Center, PAU by mushroom trainees from KVK, Kheri	27
03.12.2018	Visit of Mushroom Research Center, PAU by farmers from Jammu	37
05.12.2018	Visit of Mushroom Research Center, PAU by students from TAU Agricultural College and Research Institute, Coimbatore	118, 5 faculty
06.12.2018	Visit of Mushroom Research Center, PAU by farmers from Jammu	35
06.12.2018	Visit of Mushroom Research Center, PAU by students from College of Agriculture, VC farm, Mandya, UAS, Bengaluru	26B, 17 G, 3 faculty
14.12.2018	Visit of Mushroom Research Center, PAU by farmers organized by Horticulture department, Punjab	15
17.12.2018	Visit of Mushroom Research Center, PAU by students from CoA, KAU, Vellayani, Kerala	23B, 79G 3 faculty
07.01.2019	Visit of Mushroom Research Center, PAU by farmers from Hanumangarh (Rajasthan) organized by ATMA	30
11.01.2019	Visit of Mushroom Research Center, PAU by students from DAV Public School, BRS Nagar, Ludhiana	100, 3 faculty
14.01.2019	Visit of Mushroom Research Center, PAU by students from DAV Public School, BRS Nagar, Ludhiana	100, 3 faculty
17.01.2019	Visit of Mushroom Research Center, PAU by students from DAV Public School, BRS Nagar, Ludhiana	100, 3 faculty
25.01.2019	Visit of Mushroom Research Center, PAU by students from DAV Public School, BRS Nagar, Ludhiana	100, 3 faculty
28.01.2019	Visit of Mushroom Research Center, PAU by farmers from Haryana in ICAR sponsored Farmers First Project	28
07.02.2019	Visit of Mushroom Research Center, PAU by delegates of Research and extension specialist's workshop for fruits, mushroom, agroforestry alongwith post-harvest management, farm power and machinery, food technology and agri-economics	55
18.02.2019	Visit of Mushroom Research Center, PAU by students from Don-Bosco COA, Sulcorna, Goa	40, 2 faculty
05.03.2019	Exposure Visit of mushroom growers at Bajwa mushroom farm, Kurukshetra	
07.03.2019	Visit of Mushroom Research Center, PAU by students from AS PEE College of Horticulture & Forestry, Navsari Agricultural University, Gujarat	29 B, 28 G, 3 faculty



Table 6.50. Participation in Seminar/Conference/Workshop/Symposia (State/National/International level)

Sr.No	Programme and title	Organizing/ sponsoring agency	Date and Venue	Name of scientists
1.	Research and extension specialist workshop on fruits, mushroom, agroforestry alongwith post-harvest management, FPM, FT and Agril economics, PAU, Ludhiana	State Deptt. of Hort. and PAU, Ludhiana	10-11.05.18 PAU, Ludhiana	Drs HS Sodhi, PP Sahota, S Kapoor, GS Kocher, Shivani Sharma, Seema Garcha
2.	XXth Annual Workshop AICRP on Mushrooms at MPUAT, Udaipur	DMR, Solan and MPUAT, Udaipur	04-05.05.18	Dr HS Sodhi Dr Shivani Sharma
3.	Food convention-Conference on trends, challenges and opportunities in Agro and food processing industry in Punjab	Punjab State and PAU, Ludhiana	16.05.18 PAU, Ludhiana	Drs HS Sodhi, S Kapoor, GS Kocher, Seema Garcha, Shivani Sharma
4.	Workshop on secondary agriculture/ food processing entrepreneurial start up project-an interactive meet organized by PSCST and PAU	PSCT and PAU, Ludhiana	24.05.2018 PAU, Ludhiana	Dr HS Sodhi
5.	Orientation training of trainees for skill development in agriculture	ICAR-ATARI, Ludhiana	30.08.2018-01.09.2018	Dr HS Sodhi
6.	Brain storming workshop on crop residue management, Pal Auditorium	PAU, Ludhiana	06.09.2018	Dr S Kapoor
7.	Kisan Vikas Chamber Punjab meeting chaired by the worthy VC, PAU, Ludhiana	PAU, Ludhiana	24.01.2019	Dr S Kapoor, Dr HS Sodhi
8.	National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption	HAIC Agro R & D Centre, Murthal	31.01.2019 – 02.02.2019	Dr HS Sodhi, Dr Shivani Sharma, Dr Suman Kumari
9.	Research and extension specialist's workshop for fruits, mushroom, agroforestry alongwith post-harvest management, farm power and machinery, food technology and agri-economics	PAU, Ludhiana	06.02.2019 – 07.02.2019	Dr S Kapoor, Dr HS Sodhi Dr Shivani Sharma Dr Suman Kumari

Table 6.51. Trainings and visits abroad

Sr.No	Name and department of teacher	Institution visited	Period of visit	Purpose of visit
1	Dr. Shivani Sharma, Deptt. of Microbiology	Centre for Development Innovation , Wageningen University, Netherlands	05.11.18-16.11.18	Training on Global One Health towards animals, plants and human health.

Spawn supply

During the year 2018-19, 3427 kg mushroom spawn of *Agaricus bisporus*, *Calocybe indica*,

Pleurotus spp. and *Volvariella volvacea* was supplied to the mushroom growers of Punjab.



Fig. 6.19. QRT visit PAU



Fig. 6.20. Mushroom training on cultivation



Fig 6.21. Mushroom training on cultivation under SCSP



Fig. 6.22. Exhibition stall

Barapani Centre

Fifteen trainings and eight 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 Farmers, entrepreneurs, KVK's etc. Total spawn supplied was 724.8 kg. Total revenue generated Rs. 92,250/-.

Mushroom Day with the theme **“Mushroom in Vertical Farming”** was celebrated at Plant Pathology Farm, ICAR Research Complex for NEH Region (under AICRP

on Mushroom). Programme was attended by around 40 Farmers from different villages. Dr. Pankaj Baiswar (Nodal Officer & PI, AICRP on Mushroom) informed the gathering about the potential of mushroom cultivation in this region. He also emphasized on the technology for round the year cultivation of oyster mushroom (technology developed by ICAR, Umam for round the year cultivation of Oyster mushroom using different oyster mushroom species and strains in different months) and its potential role. Technical bulletin (in Khasi language- **“Ka jingrep tit bad ka rukom pynmih symbai tit”**) related to Mushroom cultivation and spawn production was also distributed along with Knapsack sprayers, polythene and spawn to the farmers.

Mushroom museum is also being maintained and enriched at ICAR, Umiam

Table 6.52. Trainings conducted

S.No.	Activity	Duration	No. of Participants
1.	Spawn production and mushroom cultivation (Under AICRP on mushroom and ABI)	10.09.18 to 19.09.18 (10 days)	10
2.	Mushroom cultivation for doubling farmers income	25.06.18 to 27.06.18 (3 days)	38
3.	Oyster Mushroom cultivation (under NPOF, three days)	28.01.19 to 30.01.19 (3 days)	19
4.	Mushroom cultivation and Spawn production	5.05.18-8.05.18 (4 days)	1
5.	Training on Oyster Mushroom cultivation	16.05.18	10
6.	Training on oyster Mushroom cultivation (Off campus)	17.05.18	37
7.	Training and demonstration	06.06.18	27
8.	Mushroom cultivation	26.07.18	8
9.	Mushroom cultivation	03.08.18	34
10.	Mushroom cultivation	11.09.18	16
11.	Oyster mushroom and Shiitake cultivation	28.09.18	8
12.	Oyster Mushroom cultivation	12.10.18	48
13.	Oyster Mushroom cultivation	05.12.18	26
14.	Oyster Mushroom cultivation	12.12.18	26
15.	Oyster Mushroom cultivation	15.02.19	9



Table 6.53. Demonstrations/Field day/Mushroom day etc

S.No.	Activity	Duration	No. of Participants
1.	Oyster mushroom cultivation	06.06.18	24
2.	Mushroom cultivation	30.08.18	4
3.	Demonstration on mushroom cultivation - oyster	06.09.18	15
4.	Demonstration and visit to mushroom house (in collaboration with ATMA)	28.09.18	25
5.	Field day	07.03.19	53
6.	Field day (Mushroom day)	08.03.19	40
7.	Lecture and demonstration	13.03.19	19
8.	Field day (Oyster mushroom cultivation)	27.03.19	61

Table 6.54. Spawn/culture supply

S. No.	Commodity	Quantity
1.	Spawn sale (including mother spawn)	724.8 kgs
2.	Culture	10 nos.
3.	Fresh Mushroom	130.5 kgs
	Total revenue generated	92,250/-



Fig. 6.23. Mushroom field day (Plant Pathology Farm) under AICRP on Mushroom-07.03.19



Fig. 6.24. Demonstration and hands on -Oyster mushroom cultivation



Fig. 6.25. Input distribution during a three day training programme



Fig. 6.26. Mushroom Day at ICAR, Umiam– Mushroom in Vertical Farming



IIHR Bangalore

Trainings, demonstrations, etc

- 113 people were trained on mushroom cultivation and spawn production at IIHR campus during May 2018, Sep 2018 and Jan 2019.
- Conducted 10 awareness, motivation and hands on training programs for women of different villages in Bengaluru rural district, Dodaballapur and Devenahalli taluks under Capacity building of rural women for enhancing household income and nutrition through mushroom cultivation. In each month 40 women groups were trained from the selected villages.
- Conducted 3 day training from 26-28th March, 2018 at College of Horticulture and Forestry, CAU, Phasighat, Arunachal Pradesh.
- Established 3 spawn production laboratories at Saregachi (West Bengal), KVK (Mudigere, Karnataka) and KVK (Nellore, Andhra Pradesh).
- National Mushroom day was celebrated by ICAR-Indian Institute of Horticultural Research, Hesaraghatta, Bengaluru on 23-12-2018. Sensory evaluation of mushroom soft drink developed at ICAR-IIHR was done at Govt. Primary School, Basvanapura village, Devenahalli Taluk, Bengaluru North. Twenty children aged 8-12 years of class 3-5 participated in the sensory evaluation test. Each student was asked to drink 30 ml of the product and numerically evaluate the product based on its taste.
- Five RTF bag production units (Chaff cutter and ICAR-IIHR designed multifuel Solar integrated vertical autoclave with boiler) had been established at Tribal areas of BR hills, Limbuchera (Tripura), Phasighat and Roing Lower Debang (Arunachal Pradesh) under TSP NEH fund.
- Supplied 1200 RTF bags to women groups in different selected villages to grow mushrooms at home as kitchen garden activity to enhance nutrition of daily diet under the project Capacity building of rural women for enhancing household income and nutrition through mushroom cultivation.
- Supplied 200 RTF bags on monthly basis to tribal women at BR hills for six months under TSP NEH
- Delivered 15 different lectures cum practical's on mushroom production for farmers under BhooSamrudhi, Sujala and other schemes.
- ICAR-IIHR helps Aspirational districts in Karnataka through skill development trainings. The training was conducted from 17th July 2018 at KVK Yadagiri and on 16-18th Aug 2018 at KVK Raichur.
- Conducted Three days training program on "Recent Advances in Cultivation of Edible Mushrooms" on 17-19th August, 2018 at UAS, Raichure, Karnataka.
- Conducted one day training program on "Recent Advances in Cultivation of Edible Mushrooms" on 20th August, 2018 at COH, Mysuru, Karnataka.
- Conducted 2 days Mushroom cultivation training under Boosamrudhi project from 22-23, March, 2019 at ICAR-IIHR, Bengaluru.

WOMEN EMPOWERMENT

- 2510 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. 3277205/- was generated by the mushroom lab from April 2018 to Mar 2019.



Fig. 6.27. Mushroom spawn unit established at bio centre, Belagam, Karnataka



Fig. 6.28. Training the officials of Dept. of Horticulture, Govt. of Karnataka



Fig. 6.29. Training conducted at KVK, Yadagiri, UAS, Raichur Karnataka



Fig. 6.30. Women participated in hands on training program



Fig. 6.31. Women empowerment by mushrooms through RTF bags



Fig. 6.32. Arka mushroom chutney powder technology commercialized by ICAR-IIHR



Fig. 6.33. Release of technical bulletin 'crop waste to food plate' by Dr. Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) during ICAR-IIHR foundation day

Manipur Centre

Table 6.55. Two and Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
4 th -5 th June 2018	44	15	29
13 th -15 th June 2018	27	15	12
21 st – 23 rd June 2018	61	27	34
5 th – 7 th September 2018	25	19	6
17 th – 18 th September 2018	13	5	8
17 th -20 th Oct. 2018	27	10	17
8 th - 9 th Nov. 2018	31	26	5
11 th - 12 th March 2019	26	13	13
19 th - 20 th March 2019	22	11	11
25 th - 26 ^h March 2019	33	17	16
28 th – 30 th March 2019	27	13	14
Total	336	171	165

Table 6.56. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
25 th Sept – 8 th Nov 2018	15	10	4

Table 6.57. Coverage in mass media

1.	Participation in exhibitions	Participated in three State Level exhibitions
2.	TV programmes	A documentary on Scientific cultivation of Button mushroom (in Manipuri and Hinid) covered by DDK, Imphal
3.	Radio programmes	One Radio talk
4.	Farmers Scientists exhibition	Four
5.	Newspaper coverage	Newspaper coverage for different training prograames and National Mushroom Day, 2018

Table 6.58. Exposure visit of Farmers and Students

Date	Number of farmers/students	Number of male participants	Number of female participants
6 April 2018 (entrepreneurship units)	36 students	18	18
5-7 June, 2018 (DMR, Solan)	10 farmers	9	1
24-26 Oct, 2018 (DMR, Solan)	11 farmers	8	3
13-15 Dec, 2018 (DMR, Solan)	2 farmers	2	0



Table 6.59. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Hee Yai Mushroom	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i> , <i>P. flabellatus</i>	21900 kg
Leima Mushroom	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i> , <i>P. flabellatus</i> , <i>P. Sapidus</i> .	7300 kg
Jamini Mushroom	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	12000 kg
Binita Mushroom	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	8000 kg
Green Biotech Ecosolutions Pvt. Ltd.	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i> , <i>P. flabellatus</i>	4200 kg
Integrated Mushroom Association	Mushroom spawn	600 kg
M/s Pureiromba Enterprises, Imphal East	<i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	1200 kg
RNBA, Imphal West	Mushroom spawn	1050 kg
Rama Foundation, Imphal West	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	8000 kg
Universal Mushroom Club, Imphal West	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	6000 kg
Nupi Tengbang Lup, imphal West	<i>P. sajor caju</i> , <i>P. oystratus</i>	4000 kg
M/s Sana Leibak Mushroom Farm, Imphal West	<i>P. sajor caju</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i>	9500 kg
Sidayai Chengum Producer Company Limited (CIN: U01100MN2016PTC013508)	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Hypsizygyus ulmarius</i> , <i>P. flabellatus</i>	9150 kg

Table 6.60. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Dr. Anupam Barh	Scientist, ICAR-DMR, Solan	21-23 June 2018
Dr. Shwet Kamal	Principal Scientist, ICAR-DMR, Solan	25 - 26 March 2019

Table 6.61. Spawn supply

Item	Species	Supply (Kg/number)
Spawn	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Lentunula edodus</i> , <i>Calocybe indica</i> , <i>Agaricus bisporus</i> ,	3039.7 kg
Master spawn	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Lentunula edodus</i> , <i>Calocybe indica</i> , <i>Agaricus bisporus</i>	57 kg
Culture tubes	<i>P. sajor caju</i> , <i>P membranatus</i> , <i>P. florida</i> , <i>P. oystratus</i> , <i>Lentunula edodus</i> , <i>Calocybe indica</i> , <i>Agaricus bisporus</i>	95



Experiential learning

- 45 RAWE students during 8nd March – 7nd April 2018
- 8 RAWE student during 4th August – 4th Sept 2018
- 40 RAWE students during 8th March to 7th April, 2019

Total no of students: 93 Students

Gender wise distribution: 45 Male and 48 Female

National Mushroom Day 2018 celebrated at ICAR, Manipur centre

The National Mushroom Day 2018 which falls on December 23 every year was celebrated at ICAR Research Complex for NEH Region, Manipur Centre under the theme “Mushroom in Vertical Farming”. The inaugural function of the said event was graced by Shri K. Kipgen, Director, Department of Horticulture and Soil Conservation, Government of Manipur; Dr. R. Ravi Babu, Deputy General Manager, NABARD, Manipur RO and Dr. I. Meghachandra Singh, Joint Director, ICAR Manipur Centre as Chie Guest, Guest of Honour and President, respectively. The event was also graced by Dr. M. R. Sahoo, Dr. S. S. Roy and Dr. Arati Ningombam.

Shri K Kipgen, Director (H&SC), in his speech as Chief Guest lauded ICAR for organizing such important event and highlighted the potential of mushroom in a small state like Manipur. He also described the schemes of MIDH which can be availed by mushroom growers in the state. Dr. R. Ravi Babu, DGM (NABARD) emphasized the role of mushroom for doubling the farmers’ income and transforming the livelihood of the mushroom growers; while Dr. I. M. Singh in his presidential speech emphasized the eco-friendly way of mushroom production and also highlighted the mushroom technologies developed and disseminated by ICAR. The welcome address and vote of thanks were delivered by Dr. M. R. Sahoo and Dr. S. S. Roy, respectively.

More than 50 mushroom growers from different parts of the state, ICAR scientists and representative from KVKs and NABARD participated in the programme. Presentations on mushroom production and processing were made by ICAR experts during technical session. One mushroom exhibition was also organized as an integral part of the said event. Leima Mushroom, Imphal East; Hee Yai Mushroom, Imphal East and Aapihang Food Processing Centre; Chandel were awarded first, second and third prize, respectively in the valedictory function.



Fig. 6.34. National Mushroom Day celebration at Manipur Centre



Nagaland Centre

Table 6.62. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
12.07.18	104		
27.07.18	34	19	15
05.02.19	50	-	50

Table 6.63. Three days training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
February 14-16, 2019	19	2	17
March 5-7, 2019	18		

Table 6.64. Four days training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
September 17-20, 2018	11	25	36

Table 6.65. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants

Table 6.66. Coverage in mass media

Participation in exhibitions	1
Farmers Scientists exhibition	1

Table 6.67. Exposure visit of Farmers

Date	Number of farmers/students	Number of male participants	Number of female participants
17.09.18	26 (Patkai Christian college)	13	13
19.02.19	59 (Hope Academy, Dimapur)	30	29

Table 6.68. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Sosang (NGO)	Shiitake, Oyster	1 tonne (Oyster), Shiitake is under production stage.

Table 6.69. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Shri. P. B. Acharya	Hon’ble Governor of Nagaland	24.11.18

Table 6.70. Spawn supply

Item	Species	Supply (Kg/number)
Spawn	Oyster	798 packets (159.5 kg)
Master spawn		
Culture tubes		

Experiential learning

- Number of student: 1
- Gender wise distribution 1 (Female)



Fig. 6.35. Training programmes organized by Nagaland centre



Fig. 6.36. Farm visit by Nagaland centre



Fig. 6.35. Hon’ble Governor of Nagaland Shri. B. P. Acharya visited spawn and mushroom incubation unit at Nagaland Centre, Medziphema

Palampur Centre

Table 6.71. Lectures delivered in trainings on Mushroom Cultivation

Date	Topic	Orgnised by	No of farmers
05-10-2018	Method of making spawn and practical, Diseases in mushroom and its management	Mushroom Development PROJECT Palampur	50
03-11-2018	Cultivation of Mushroom and dhingri as an additional income generating income	Director of extension education, CSKHPKV Palampur	25
16-11-2018	Mushroom and dhingri cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25
20-11-2018	History scope and prospectus of mushroom cultivation in india and himachal paradesh	Krishi vigyan Kendra kangra	20
01-12-2018	Cultivation of summer mushroom	Krishi vigyan Kendra kangra	20
07-12-2018	Diseases in mushroom and its management	Mushroom Development PROJECT Palampur	40
07-12-2018	Mushroom and dhingri cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25
11-01-2019	Mushroom and dhingri cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25
21-01-2019	Method of making spawn and practical and identification of wild edible mushroom	Mushroom Development PROJECT Palampur	35
23-01-2019	Diseases in mushroom and its management	Mushroom Development PROJECT Palampur	35
01-02-2019	Mushroom and dhingri cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25
06-02-2019	Mushroom cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25
12-02-2019	Method of making spawn and practical	Mushroom Development PROJECT Palampur	40
13-02-2019	Diseases in mushroom, nematode, mighs and its management	Mushroom Development PROJECT Palampur	40
8-03-2019	Mushroom cultivation in HP including visit to the mushroom unit of CSKHPKV and Indo Dutch unit	Director of extension education, CSKHPKV Palampur	25



Table 6.76. Production and sale of spawn compost and mushroom in the year of 2018-2019 by the ELP students

Month	Spawn (kg)	Rs	Mushroom (kg)	Rs
Nov, 2018			74.6	11200.00
December 2018	80	8000.00	160	24000.00
March 2019	69	6900.00	-	-
Total	149	14900.00	234.6	35200.00
Grand total		50100.00		



Fig. 6.38. Mushroom Trianing at Palampur

Pantnagar Centre

Table 6.77. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
19 June to 23 June, 2018	35	0	35
16 July to 18 July, 2018	33	17	16
19 July to 21 July, 2018	19	19	0
04 Sep to 6 Sept, 2018	113	103	10
25 Oct to 29 Oct, 2018	29	29	0
13 May to 17 May, 2019	39	37	2
19 Mar to 20 Mar, 2018	31	31	0
23 Mar-24Mar, 2018	28	28	0
Total numbers of participants	327	264	63

Table 6.78. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants

Table 6.79. Coverage in mass media

Sl No.	Particulars	Numbers
1.	Participation in exhibitions	02
2.	TV programmes	01
3.	Radio programmes	02
4.	Farmers Scientists exhibition	02
5.	News paper coverage	01

Table 6.80. Exposure visit of Farmers

Date	Number of farmers/students	Number of male participants	Number of female participants
07.12.2018	18 farmers	18	0
07.12.2018	42 farmers	42	0
04.01.2019	39 students	20	19
04.01.2019	42 farmers	42	0
02.02.2019	31 farmers	0	31
05.02.2019	37 farmers	37	0
06.02.2019	32 farmers	32	0
Total famers	241	191	50

Table 6.81. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Dr. RK Ranga, IAS	Ex chef Secretary of Harayana Govt.	27.10.2018
Ms. Alison Burchel	Secretary Ministry of education heritage and arts, Govt Figi	15.12.2018
Mr. Uwe ohls	KFW Germany	03.02.2019
Dr VP Sharma	Diector, DMR, Solan	25.04.2019

Table 6.82. Spawn supply

Item	Species	Supply (Kg/number)
Spawn	Button mushroom	685 kg
	Oyster mushroom	631 kg
	Milky mushroom	143 kg
Master spawn	Button mushroom	03 Number
	Oyster mushroom	07 Number
	Milky mushroom	06 Number
Culture tubes	Button mushroom	05 Number
	Oyster mushroom	07 Number
	Milky mushroom	01 Number



Experiential learning

- Number of student: 131
- Gender wise distribution: Girls: 70; Boys: 61

Participation in seminar/symposia/workshop etc

Annual workshop of AICRP on mushroom is attended at Udaipur (Raj.) held on May 04 to 05, 2018.



Fig. 6.39. Training programmes organized at Pantnagar centre



Fig. 6.40. Ms Alison Burchel, Permanent Secretary, Ministry of Education, Govt of Haryana visited the Center on Dec 15.2018

Fig. 6.41. Dr.RK Ranga IAS (Ex-Chief secretary) of Haryana Government visited the Center on 27.10.18

Fig. 6.42. Visit of Hon'ble Chancellor GBPUAT on Pantnagar 10 Oct, 2018

Fig. 6.43. Mr.Uwe ohls, KFW Germany visited the center on Feb. 03.2019



Table 6.87. Exposure visit of Farmers

Date of training	Number of farmers/students	Number of male participants	Number of female participants
15 th June, 2018	30	20	10
04 th December, 2018	26	08	18
06 th February, 2019	36	26	10
13 th March, 2019	80	30	50
13 th March, 2019	22	13	09

Table 6.88. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Mrs. Ering, SDHO, DHO office, Pasighat	Oyster (White and Pink)	For official purpose
Mr. Okik Ering, Napit Pasighat	Oyster (White and Pink)	1-2quintal
Mr. Morka Bagra	Oyster (White and Pink)	1-2quintal
Mr. Kage Bagra	Oyster (White and Pink)	1-2quintal
Mr. Nyummak Bagra	Oyster (White and Pink)	1-2quintal
Mrs. Yagam Tasing, Rani, Pasighat	Oyster (White and Pink)	2-3quintal
Dr. Family at Namsai, A.P.	Oyster Mushroom	For family purpose

Table 6.89. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
10th Board of Studies Members		21 st April, 2018
Dr. A. N. Maurya		
Dr. K. K. Jindal	Ex-Director, I. Ag. Sc. BHU, Varanasi	
Dr. N. B. Singh	Ex-DOR, CAU, Imphal (Manipur)	
Dr. A.K. Pandey	Dean, College of Post Graduate Studies in	
Dr. B.N. Hazarika	Agricultural Sciences, Umiam, Meghalaya	
	Dean, CHF, CAU, Pasighat, (A.P.)	
	Dean, COA, CAU, Pasighat, (A.P.)	
Dr. S. Ayyapan and Prof. M. Premjit Singh	Hon'ble Chancellor and Vice Chancellor, CAU, Imphal, Manipur	13 th May, 2018
Mr. Yatin Mokal I Dr Amitava Sanya	GM-technical & Regulatory, Affairs, Mumbai Regulatory Director, Sumitomo Chemical India Pvt. Ltd., New Delhi	6 th September, 2018
Mr. Prashant Gautam and his family	Superintendent Police, District East Siang	12 th November, 2018
Prof. M. Premjit Singh and his Guest	Hon'ble Vice Chancellor, Central Agricultural University, Imphal (Manipur)	15 th October, 2019
Prof. Saket Kushwaha	Hon'ble Vice Chancellor, Rajiv Gandhi University, Doimukh, Itanagar, Arunachal Pradesh	07 th March, 2019

Table 6.90. Spawn supply

Item	Species	Supply (Kg/number)
Spawn	Oyster (White), Oyster (Pink) and Shiitake	6.24 quintal
Fresh Mushroom	Oyster	13.15kg

Table 6.91. Experiential learning

S. No.	Class	Total Students	Boy (s)	Girl (s)
1.	B.Sc. Hon. (Ag.)	04	03	01
2.	B.Sc. Hon. (Hort.)	07	—	07
Total		11	03	08



Fig. 6.44. One day, ten days and ninty days trainings at Pasighat centre



Fig. 6.45. Demonstration and exposure visits at Pasighat centre



Fig. 6.46. Farm visits/ Consultancy service at Pasighat centre



Fig. 6.47. Visit of dignitaries at Pasighat centre

Ranchi Centre

In 2018-2019, five residential training were conducted at the centre on ‘Mushroom cultivation, Marketing and their Value addition’. A total 123 beneficiaries were benefited due to these programmes.

Table 6.92. Residential Training on Mushroom cultivation

Date of Training	Duration of Training	No of beneficiaries	Sponsoring agencies
26-28 Nov., 2018	3 days	25 (15 Female, 10 male)	ATMA, Lohardaga, JH
03-05 Dec., 2018	3 days	25 (16 Female, 9 male)	ATMA, Lohardaga, JH
10-12 Dec., 2018	3 days	25(14 Female, 11 male)	ATMA, Lohardaga, JH
18-22 Feb., 2019	5 days	23 (11 Female, 12 Male)	ATMA, Sahebganj, JH
06-08 Mar., 2019	3 days	25 (20 female, 5 male)	ICAR-RCER, RC Ranchi

Table 6.93. Exposure visit cum one day training activities of Mushroom cultivation of the Centre

Date of Training	No. and Details of beneficiaries
3 April, 2018	32 Army personnel’s of Punjab Regiment visited and learned Spawn and Oyster Mushroom production techniques (All Male)
16 May, 2018	40 Retailers of Agri-inputs learned spawn and Oyster mushroom cultivation as well as Fungicides and their mode of action (38 Male and 2 Female)
28 June, 2018	40 (34 women and 6 men) of Khooty were learned oyster mushroom cultivation at the centre
21 August, 2018	36 Women of Tamar Khooty and Ranchi learned oyster mushroom cultivation for generation of income using waste paddy straw
23 Aug., 2018	36 (30 female and 6 male) Students of B. Sc. (Bio) Xavier College, Ranchi learned mushroom cultivation
27 Sept., 2018	40 Women of Gumla, Giridih and Ranchi, Learned mushroom production Technology at the centre
28 Sept., 2018	40 Women of Tamar, Ranchi, Learned mushroom production Technology at the centre
26 October, 2018	36 (30 women aspirants + 6 male) farmers of Lohardaga learned mushroom spawn and mushroom cultivation
4 Dec., 2018	32 womens of Kutiyatu and Tetri (Per urban village)
11 Dec., 2018	30 Women farmer of Multi (A peri-urban village), Ranchi learned Oyster mushroom cultivation
23 December, 2018	On the Eve of Mushroom day, a total 135 (80 women) leaned Indore cultivation of Oyster mushroom
4 Feb., 2019	24 (18 female) Student of Rai University, Ranchi learned oyster mushroom cultivation.
12 Feb., 20119	22 Farmer of Giridih, Jharkhand(15 women and 7 male)
16 Feb, 2019	60 female students of Ranchi Women College, Ranchi, gain experiences of Oyster mushroom cultivation at the centre
19 February, 2019	32 (6 Male and 26 female) farmers of ATMA Saheb ganj learned mushroom cultivation

Table 6.94. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Mushroom Tub, Ranchi	Button	100 TPA
Ramgarh Mushroom	Button	100 TPA



Fig. 6.48. Extension activities at Ranchi Centre

Mushroom Spawn Production

ICAR-Research complex for Eastern region, Research centre Ranchi is a leading mushroom spawn producers in the locality of Jharkhand. The centre supplied round year mushroom spawn of Oyster, milky, paddy straw and button to the

growers of Jharkhand, Chattishgarh, Bihar and Odisha. In 2018-2019, a total 4184.0 Kg mushroom spawn were produced. Among, 4184 Kg of mushroom spawn, 500 Kg aprox. were used in Research and extension activities during the year. A total Rs. 4.18 Lakhs revenue was generated by the sale of mushroom spawn (Fig. 6.49).

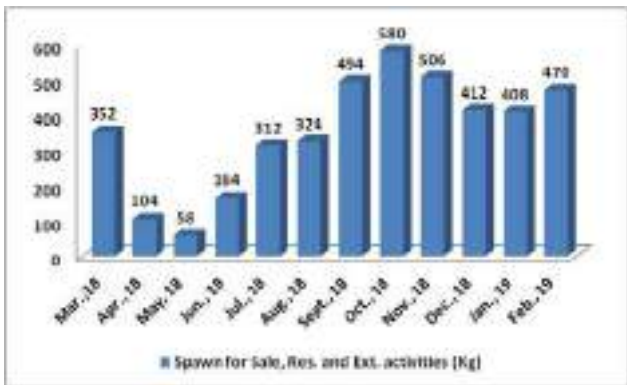


Fig. 6.49. Month wise spawn production by Ranchi Centre

Celebration of National Mushroom day at Kutiyatu Panchayat, Namkum Ranchi

National Mushroom Day was organized and celebrated in the Panchayat building of Kutiyatu, Namkum Block, Ranchi, Jharkhand on dated December 23, 2018. On this Occasion 40 men and 80 women of the Kutiyatu Panchayat, Namkum block, Ranchi along with 15 women of Khooty District (total 135 persons) were gathered for National Mushroom Day celebration and Hands on training of Oyster Mushroom Cultivation. Dr. A. K. Singh, Head, ICAR-Research Complex for Eastern Region, Research Centre, Ranchi, Jharkhand attended the programme as a Chief Guest. He addressed the gathering and also invited unemployed youth to come and visit ICAR-Research Complex for Eastern Region, Research Centre, Ranchi, Jharkhand and join the hands for mushroom cultivation for generation self employment. Dr. Bikash Das and Dr. Priyaranjan Kumar also addressed the gathering as a Guest of honour of the Programme. Dr. Bikash Das, Principal Scientist (Horticulture), has given stress on the generation of rural employments by adopting Mushroom cultivation as a business. Dr. Priyaranjan Kumar, Principal Scientist (Seed Tech.) has given emphasis on mushroom cultivation for generation of wealth from the waste. Myself Dr. Sudarshan Maurya, Sr. Scientist (Plant Pathology)

had given emphasis on Vertical Farming of Oyster Mushroom Cultivation. During the National Mushroom Day celebration at Kutiyatu, Namkum, Ranchi, Five progressive farmers namely Mr. Kumar Chiranjeev Jha of Ranchi, Mr. Dharmendra Kumar Singh, Ramgarh, Mr. Sanjay Kumar Mahto and M/s Shashanjali Agro from Khooty and Sanjeev Kumar Mathur from Jamshedpur (01) were awarded for their pioneer contribution in promotion of Oyster Mushroom in weaker section of the society for the upliftment of their livelihood and income generation. Mr. Sanjeev Kumar Mathur has given emphasis on post harvest management and value addition of Oyster mushrooms. They also shared their experience of the mushroom cultivation and how mushrooms transformed their life. Whole programme smoothly conducted by Dr. Santosh S. Mali and also given vote of thanks to the guest and gathering. After the Celebration of National Mushroom Day, we have conducted Hands on training on Oyster mushroom cultivation has given to the aspirants by the master trainers. Aspirants also prepared oyster mushroom bags and prepared bags also gifted to the aspirants.

Technology showcasing of “recent advances in Mushroom production technologies and their value addition’ at Global Food Summit on date 29-30 November, 2018 on behalf of ICAR-Directorate of Mushroom Research, Solan, HP

On behalf of ICAR-Directorate of Mushroom Research Chambaghat Solan, recent technologies of mushroom cultivation and their value addition showcased at Global Food Summit, Ranchi, Jharkhand on dated 29-30 November, 2018. During the technologies showcasing thousands of visitors visited at our counter and learned the advances of mushroom cultivation and also bought value added product from the counter.



Fig. 6.50. Technology showcasing at Global Food Summit and media coverage

Sikkim Centre

Table 6.95. Table-One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
13.04.2018	16	10	6
17.04.2018	6	6	-
31.07.2018	18	5	13
25.07.2018	25	-	25
27.08.2018	14	10	4
01.09.2018	18	18	-
14.11.2018	24	17	7
23.12.2018	47	15	32
17.01.2019	8	5	3
29.01.2019	12	11	1
31.01.2019	29	19	10
24.02.2019	11	11	-
25.02.2019	10	10	-
06.03.2019	7	3	4

Table 6.96. Table-Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
26.12.2018-28.12.2018	21	5	16

Table 6.97. Table-Five day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
14.03.2019-18.03.2019	21	3	18



Table 6.98. Table-Coverage in mass media

Participation in exhibitions	1 (Sikkim Organic Day cum Krishi Unnati Mela on 17-18.01.2019)
TV programmes	-
Radio programmes	-
Farmers Scientists exhibition	1
News paper coverage	3

Table 6.99. Table-Exposure visit of Farmers

Date of training	Number of farmers/students	Number of male participants	Number of female participants
23.05.2018	36	25	11
31.05.2018	12	12	-
25.09.2018	25	25	-
26.09.2018	27	21	6
08.02.2018	16	16	-
04.12.2018	35	35	-
17.12.2018	10	10	-

Consultancy provided to farmers:

1. Mr. Anand Pradhan, Rumtek, East Sikkim: Oyster mushroom
2. Mrs Premkit Lepcha, Saddam, South Sikkim: Oyster mushroom
3. Mrs. Harimaya Pradhan, Pakyong, East Sikkim: Oyster mushroom
4. Mr. Mingur Bhutia, Pakyong, East Sikkim: Oyster Mushroom

Table 6.100. Table-Visit of dignitaries

Name of Visitor	Designation	Date of Visit
1. Shri Ganga Prasad	Hon'ble Governor of Sikkim	21.09.2018

Table 6.101. Spawn supply

Item	Species	Supply (Kg/number)
spawn	<i>Pleurotus</i> spp	300 kg
Master spawn	-	
Culture tubes		

Experiential learning

- Number of student: Seven students of B.Sc. (Horticulture) from Sikkim University, Gangtok
- Gender wise distribution: three boys and four girls



Fig. 6.51. Training and demonstartion programs organised by Sikkim centre

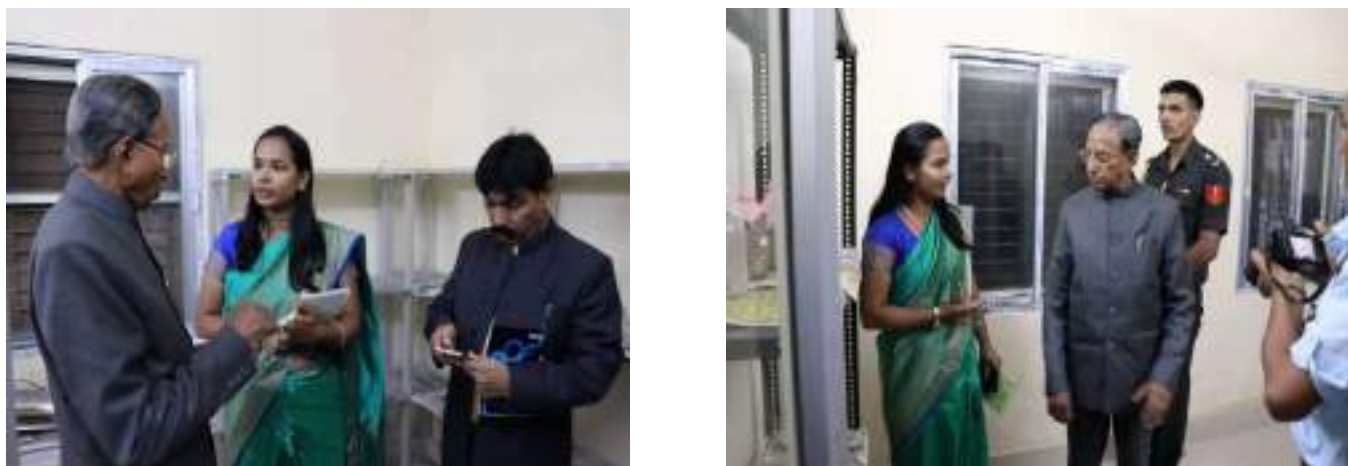


Fig. 6.52. Visit of Shri Ganga Prasad, Hon'ble Governor of Sikkim to Sikkim centre

Udaipur Centre

Table 6.102. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
14-08-2018	40	27	13

Table 6.103. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
20-06-2018 to 22-06-2018	40	30	10
17-07-2018 to 19-07-2018	50	39	11
17-09-2018 to 19-09-2018	39	27	12
02-11-2018 to 04-11-2018	30	21	09
26-12-2018 to 28-12-2018	20	11	09
15-01-2019 to 17-01-2019	25	19	06
06-03-2019 to 08-03-2018	55	40	15
13-03-2019 to 14-03-2018	30	20	10
17-03-2019 to 18-03-2018	30	17	13
25-03-2018 to 26-03-2018	15	09	06

Table 6.104. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
16-08-2018 to 20-08-2018	50	50	NIL

Table 6.105. Coverage in mass media

Participation in exhibitions	02
TV programmes	06
Radio programmes	02
Farmers Scientists exhibition	03
News paper coverage	25

Table 6.106. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Sri Ji Cold Storage & Mushroom Farm	Button	180 tons per annum
Arora Cold Storage & Mushroom Farm	Button	360 tons per annum
Gurubaksh Mushroom Farm	Button	540 tons per annum
Shibba Mushroom Farm	Button	36 tons per annum



Table 6.107. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Dr. T. Jankiram	ADG, Hort., ICAR, New Delhi	15.05.2018
Dr. Anand Krishna	Joint Director, RKVY, Govt. of India	03.01.2019
Dr. P.K. Rai	Director, DMR-Rapeseed & Mustard Research, ICAR, Bharatpur	04.08.2018
Dr. P.S.Rathore	Vice Chancellor - Jobner Agril. University, Jobner, Jaipur	04.08.2018
Dr. A.K.Mehta	Director Research, MPUAT	02.01.2019

Table 6.108. Spawn supply

Item	Species	Supply (Kg/number)
spawn	Oyster, Button & Milky Mushroom	1345.6 kg
Master spawn	Given to Govt. of Rajasthan Agencies	ATC Centres of Govt. of Rajasthan.
Culture tubes	Each centre was given two sets of Oyster, Button and Milky cultures.	ARS-Durgapura, ARS-Sri Ganganagar & Jodhpur Agril. University

Experiential learning

- Number of student-60
- Gender wise distribution: 27 Females and 33 Males.

Participation in seminar/symposia/ workshop etc

- Conducted 20th Annual Mushroom Workshop from 4-5 May 2018 at MPUAT, Udaipur SUCCESSFULLY.



Fig. 6.53. Training and demonstration at Udaipur Centre



Fig 6.54. Visited Stall by Hon’ble Chief Minister, Principal Secretary, Ag. Minister & Panchayti Raj Minister



Fig. 6.55. Farm visit by AICRP Udaipur Scientist

Vellayani Centre

Table 6.109. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
27-04-2018	10 (Balasasthra congress)	4	6
17-06-2018	30 (GVHSS Punnamoodu)	14	16
10-01-2018	60 (RATTC)	13	47
12-01-2019	48 (Santhigiri Ashramam)	42	6
18-02-2019	38 (Kalliyoor Kudumbashree)	0	38

Table 6.110. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
23-5-2018 to 24-5-2018	12	3	9
20-7-2018 to 21-7-2018	31	20	11
18- 2-2019 to 19-2-2019	23	10	13



Table 6.111. Coverage in mass media

Participation in exhibitions	1. Participated in the exhibition organized as part of World Environment day at College of Agriculture, Vellayani on June 5, 2018
	2. Participated and exhibited the spawn and beds at Exhibition organized by CSIR_ NIST on June 12, 2018
	3. Participated in the exhibition conducted as part of ZREAC at Vellayani on 3-10-2018
	4. Participated in the international exhibition of value added products on VAIGA- at Thrissur on 26-30 December 2018
TV programmes	Live telecast on Mushroom cultivation on 5-7-2018 in Dooradarshan

Table 6.112. Visit of dignitaries

Name of Visitor	Date of Visit
Dr. DS Rathore, Chairman, QRT	30.10.2018
Dr R.P. Tewari	30.10.2018
Dr H.B. Singh	30.10.2018
Dr R.K Pal	30.10.2018
Dr S.R.Bhat	30.10.2018

Table 6.113. Spawn supply

Item	Species	Supply (Kg/number)
spawn	<i>Pleurotus florida</i> and <i>Calocybe indica</i>	575
Master spawn		5
Culture tubes		3

Experiential learning

- Number of student : 26
- Gender wise distribution : Males: 3 ,Females :



Fig. 6.56. Training condctued on mushroom cultivation



Fig. 6.57. Visit of QRT team



Fig 6.58. Exhibition and awerenss programme

Hisar Centre

Table 6.114. Detail of Vocational Trainings during 2018-19

Detail of Training	No. of trainings	No. of beneficiaries
No. of trainings at Hisar (3-5 days)	07	200
25 days training at KVK Kurukshetra	01	20
10 days training at Central Jail, Hisar	01	50
10 days training for UG and PG students of Agriculture	01	50
Training’s conducted at KVK’s (3-7 days):	19	581
Total	29	901

Table 6.115. Other Extension Activities

Name of Extension activity	No. of activities	Number of beneficiaries
Field days	01	50
National Mushroom Day	01	1000
Camps	01	42
Farmers visited at Mushroom Technology Lab.	-	270
Method demonstrations	12	240
Exhibitions	05	>20000
Mushroom Extension literature distributed	02	660
Expert lectures	20	638
Radio and TV talks	01	-



Table 6.116. Promotion and sale of Mushroom and other items during 2018-19 at AICRP (Mushroom)

Sr No.	Item	Qty. Sold (Qtls.)
1	Fresh Button Mushroom	20.14
2	Button Mushroom Spawn	63.88
3	Compost	111.00

Coimbatore Centre

Table 6.117. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
05.04.2018	42	32	10
07.05.2018	74	50	24
05.06.2018	62	50	12
05.07.2018	64	45	19
06.08.2018	28	25	3
20.08.2018	36	30	6
05.09.2018	36	30	6
05.10.2018	43	36	7
25.10.2018	16	13	3
07.11.2018	11	9	2
05.12.2018	39	34	5
07.01.2019	67	35	32
05.02.2019	41	27	14
05.03.2019	41	22	19

Table 6.118. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
28.05.18-01.06.18	10	8	2
25.06.18-29.06.18	6	5	1
23.07.18-27.07.18	5	3	2
27.08.18-31.08.18	5	3	2
17.12.18 -21.12.18	4	4	-



Table 6.119. Coverage in mass media

Participation in exhibitions	Participated in the AGRI INTEK - CODISSIA and exhibited the mushroom varieties July, 2018
Radio programmes	Three radio programmes : All India Radio (Podigai) (i) Importance of mushroom cultivation and oyster mushroom cultivation technology (ii) Milky mushroom cultivation technology (iii) Pest and Disease management in mushroom cultivation

Table 6.120. Exposure visit of Farmers

Date	Number of farmers/students	Number of male participants	Number of female participants
18.4.2018 (IWMP Society- Dharapuram)	47	20	27
28.6.2018 (Tumkur)	34	20	14
30.8.2018 (Tiruvarur)	30	26	4
23.10.2018 (Agricultural extension Centre,Theni)	35	30	5
8.1.2019 (Ooty)	100	75	25
25.1.2019 (Tribal welfare, Salem)	12	6	6
29.1.2019 (ATMA, Nedumkandam)	13	8	5
30.1.2019 (ATMA, Thiruvallur)	54	40	14

Table 6.121. Students visited AICRP Mushroom

Date	School/ College	Number of students	Number of male participants	Number of female participants
17.4.2018	Suguna International School, Coimbatore	80	45	35
18.4.2018	Karl Kubel Institute for Development Education, German	16	2	14
12.7.2018	Vanavarayar Institute of Technology, Pollachi	139	70	69
23.7.2018	St. Philomena's College ,Mysore	43	30	13
24.7.2018	College of Horticulture, Bagalkot	14	7	7
16.8.18	G.R. Damodaran Matric Hr. Sec. School,Peelamedu	20	20	-
6.9.2018				
25.9.2018	Government Boys Hr. Sec. School, Thondamuthur	56	56	-
23.7.2018	Pasumpon Muthuramalinga Thevar College, Usilampatti	66	40	26
3.10.2018	Karl Kubel Institute for Development Education, German	18	6	11



Table 6.122. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
K.V.Rajkumar	Deputy Collector,Erode	21.05.2018
C. Vidya	Deputy Collector,Villupuram	09.01.2019
Dr.Venkatesh Balan	Dept. of Engineering Technology, University of Houston, USA	23.12.2018
Dr. D.S. Rathore, Dr. R.P. Tewari, Dr. R.K. Pal, Dr. S.R. Bhat, Dr. H.B. Singh, Dr. Shwet Kamal	QRT TEAM Visit Chairman & Members	29.10.2018 to 30.10.2018
Dr. N.Krishnakumar	International Biodiversity, New Delhi	09.03.2019
Dr. V.P. Sharma	Director, ICAR – DMR, Solan	24.04.2019
Anushya and Sikdhar	UGC Seminar	

Experiential learning

a. UG Course Commercial Production of mushrooms for BSc(Ag.) and BS (ABM) (Dec.2018 to May 2019)

- Number of student : 40
- Gender wise distribution : 36 Female and 4 male

b. Distance Learning programme on Mushroom Cultivation (11.03.2018 to 19.08.2018)

Total 17 members : Female : 10 Male :

Participation in seminar/symposia/ workshop etc

1. National symposium on cutting edge approaches for sustainable disease management and ensuring farmers profit” at NRCB, Trichy, 21-23rd Dec.2018
2. Workshop on Development of New generation molecules and Bioagents for the management of Fungal Nematode Complex at Dept. of Plant Pathology,TNAU, Coimbatore 02.05.2018



Fig. 6.59. One day training on Mushroom cultivation at TNAU, Coimbatore





Conversion of vetiver straw and garlic peel residue for production of mushrooms (G.Thiribhuvanamala et al., 2018)

Aim was to convert the crop waste in to valyable prtein rich food so as to boost additional income to farmers.Vetiver is an aromatic plant which is cultivated in about 1500 acres in Sivaganga and cuddalore districts of Tamil Nadu. Straw resembles paddy straw and has same nutritional composition. Vetiver straw can be used for cultivation of oyster mushroom and fits best in Ilntegrtaed Farming system

Vetiver straw yielded 360 g/ 350 g dry straw weight (BE of 108.6%) of *P. florida* mushrooms with B:C of 3.0. The substrate combination with paddy straw and vetiver yielded 398.3g/ 350 g dry straw weight with B: C of 3.2 (bioefficiency of 113.7 %). However, paddy straw yielded 423.3 g/ 350 g dry straw weight with B:C of 3.2 (bioefficiency of 120.9 %). The results imply that vetiver straw alone or in combination with paddy straw can be best utilized for cultivation of oyster mushroom on commercial ; can suitably fit in vetiver integrated farming system.

Garlic peel residue from industries serves as good substrate for cultivation of oyster mushroom.

Garlic peel residue can be used for production of *P.florida*, *Hypsizygus ulmarius* and *P.eous* mushrooms which yielded bioefficiency ranging from 100-105% with B;C ratio of 2.7 , when combined with paddy straw yield bioefficiency ranging from 110-115 % with B;C ratio of 2.9 to 3.0

Jammu Centre

One day awareness training conducted

- Organized Regional Seminar Series on Mushrooms for Nutritional Food Security in collaboration with Asia Pacific Institute of Food Professionals at MRTC, SKUAST-J on 14-9-2018 in which 43 (28 males, 15 females) students and scientists participated.
- Organized Capacity building of Women Farmers engaged in dhingri cultivation on 27/ 02/2019 in which 49 women participated.

Three-day training conducted

- Organized two days training as Course Coordinator on Spawn Production Technology in collaboration with SAMETI and Division of Plant Pathology w.e.f. 27th to 28th September,

Table 6.123. Coverage in mass media

Participation in exhibitions	Participated in One day Awareness Camp on Farming Techniques for Ex service men of Armed Forces at Military station, Tanda and exhibited activities of AICRP centre on 07/10/ 2018
TV programmes	Expert in documentary on Mushroom Cultivation prepared at SKUAST-J and produced by Kissan Channel, New Delhi
Radio programmes	Casual Comperer at Radio Kashmir, Jammu and compered 48 Kissan Vani programmes including programmes on various aspects of mushroom cultivation.
Farmers Scientists exhibition	- Delivered lecture on round the year mushroom cultivation during the one day visit, training and awareness programme for progressive farmers of Jammu organized by Directorate of Extension & J&K Advisory Board for development of Kissan on 15/12/18 - Delivered lecture on oyster mushroom cultivation during one day Kisan Sammelan cum Kisaan Mela organized by State Advisory Board for development of kisaans on 23/01/2019 - Delivered lecture on round the year Mushroom Cultivation during the DST-SEED project demonstration of the technologies for improving productivity of rainfed areas in Jammu district held at Div. of Agri. Engg., SKUAST-J on 30/01/19.
News paper coverage	Activities of the centre have been covered by the press media. A few clippings are enclosed with the report.

Table 6.124. Exposure visit of Farmers

Date	Number of farmers/students	Number of male participants	Number of female participants
Students and Faculty of Deptt. of Biotechnology, Govt. Degree College, Udhampur on 10-04-2018	86	12	74
Demonstrated Methods of compost preparation to the participants of ASCI training to mushroom growers on 5/11/18	26	24	02
Organized visit of students and Faculty of SKUAST-K to the mushroom centre at SKUAST-J on 19/01/19 and 23/01/19	32	14	18

Table 6.125. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Trikuta Intensive Mushroom Development Corridor under CAPEX budget	Button Mushroom, Milky Mushroom, Oyster Mushroom	300 quintals
Baba Ghulam Shah Badshah University, Rajouri	Button mushroom, Oyster Mushroom	2 quintals
Aditya Mushroom Farms, Jammu	Oyster and milky mushroom	50

Table 6.126. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Dr. V.P. Sharma	Director, IXAR-DMR, Solan	24-09-2018
Dr. N.S. Rathore	Deputy Director General (Education)ICAR, New Delhi	19-11-2018
Dr. P.K. Sharma	Hon’ble Vice ChancellorSher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, Jammu	22-10-2018

Table 6.127. Spawn supply

Item	Species	Supply
Spawn	<i>A. bisporus</i> , <i>C. indica</i> , <i>Pleurotus</i> spp.	1000 Kg
Ready to fruit compost bags	<i>A.s bisporus</i>	1007 bags of 10 kg each
Fresh mushroom	<i>A. bisporus</i> , <i>Pleurotus</i> spp.	200 Kg
Pickle of oyster mushroom		25 Kg



2018 at SKUAST-J, Jammu in which 30 officers (27 males, 3 females) participated.

Seven day/ long duration training conducted

- Organized Eight days Model Training Course on Entrepreneurship development through Spawn production and Mushroom Cultivation” sponsored by Ministry of Agriculture and

Farmers Welfare, Govt. of India held at SKUAST-J w.e.f. 19th to 26th Dec., 2018. 22(17 field officers and 5 University scientists) participated in the training programme. Gender ratio was 21 males: 1 female

Experiential learning

- Number of student: 11
- Gender wise distribution: 7 Female, 4 Male



Fig. 6.64. Visit of Hon’ble vice-chancellor; Dr. N.S. Rathore, DDG (Edu.),ICAR; Dr. V. P. Sharma Director DMR Solan and Training activities at Jammu Centre

Srinagar centre

Conducted 45 days Skill Development Certificate Training Programme on “Mushroom Production Technology” w.e.f 15 Feb., to 30 March, 2019.

03-days Training programme on “Mushroom Cultivation Technology” for Tribal farmers (under Tribal Sub Plan AICRP) at Nagbal Yousmarg, Budgam in collaboration with DMR, Solan w.e.f. 25-27th Sep., 2018.

03 mushroom units of 50-100 trays were established in three districts viz. Srinagar, Budagm & Baramullah of the valley under the technical guidance of mushroom Research and Training Centre.

Visit of dignitaries

- Hon’ble Vice- Chancellor visited Mushroom centre for observation of mushroom trials conducted under AICRP-M on 25-04-2018.

Table 6.128. Exposure visit of Farmers

1	Lecture on Mushroom Production Practice	07-02-2018	Exposure visit	80 farmers	Sub division Tangmarg Deptt. Of Agri. Kmr
2	Lecture on Mushroom Production Technology	24-4-2018	Exposure visit	50 students and staff	Lawrence Vidya Bhavan Kursoo Rajbagh
3	Information about Mushroom Production Technology	2018	Exposure visit	Students and teachers	CMP school Miskeen bagh Khanyar
4	Demonstration of mushroom production technology	10-08-2018	Practical Training	Participants of Summer school.	Division of Veg. Science SKUAST-K
5	Lecture on Mushroom Production Practice	01-12-2018	Exposure Visit	Trainees	DST, Anantnag
6	Lecture on Mushroom spawn production Tech.	2018	Practical training	Participants	Micro Ent. Dev. And Women Emp CellDOE, SKUAST-k
7	Lecture on Oyster mushroom cultivation	30-07-2018	Awareness visit	Participants	AEA Trigam Kishtwar.
8	Lecture on Mushroom production practice	10-08-18	Practical training	participants	21 days Summer school from Vegetable science
9	Demonstration of mushroom production technology	01-12-2018	Exposure visit	52 Students 10 teachers	Govt High school Nussu Qazigund Anantnag
10	Information about Mushroom Production Technology	06-12-2018	Exposure visit	20 Participants	District officer Science and Tech Department
11	Awareness on Mushroom Production Practice	16-01-2019	Awareness visit	100 farmers from Chadoora zone	Department of Agriculture
12	Demonstration of mushroom production technology	16-01-2019	Awareness visit	52 farmers from beerwah sub division	Department of Agriculture
13	Lecture on Mushroom spawn production	17-01-2019	Exposure visit	20 farmers	NGO Human welfare foundation

Table 6.129. Spawn supplied

S.No.	Name	No. of bottles	Date
1	Women Empowerment Cell SKUAST-K, Shalimar for conducting Off-campus training programme	1000 spawn bottles of button & dhingri mushroom	29-11-2018
2	FoA Wadura	100 spawn bottles of button mushroom	15-02-2018
3	Gh. Hassan Malik R/o: Jadura Pulwama	10 spawn bottles of dhingri mushroom	21-02-2018



S.No.	Name	No. of bottles	Date
4	Javid Ahmad Dar S/o Ahad Dar R/o Nathbagh Bla	90 spawn bottles of button & dhingri mushroom	01-03-2018
5	Zahida Bagum W/o Farooq A. Dar R/o Nadihal Baramulla	50 spawn bottles of button & dhingri mushroom	26-03-2018
6	Imtiyaz Ahmad Najar Ab. Gani Najar R/o Sopore Baramulla	50 spawn bottles of button & dhingri mushroom	19-03-2018
7	Shabnum Sultan	42 spawn bottles of button & dhingri mushroom	30-03-2018
8	KVK Srinagar	200 spawn bottles of button mushroom	24-10-2018
9	KVK Ganderbal	100 spawn bottles of button mushroom	24-10-2018
10	KVK Srinagar	50 spawn bottles of button mushroom	04-11-2018
11	DcTc Bandipora	50 spawn bottles of button mushroom	08-11-2018
12	Department of Agriculture, Lalmandi, Srinagar, Kashmir	40 bottles of master culture of button mushroom	19-02-2019
13	Department of Agriculture, Lalmandi, Srinagar, Kashmir	2000 spawn bottles of button mushroom	18-03-2019
14	DcTc Bandipora	80 spawn bottles of button mushroom	10-03-2019
15	KVK Ganderbal	100 spawn bottles of dhingri mushroom	23-02-2019
16	KVK Pulwama	50 spawn bottles of button mushroom	10-03-2019
17	Division of Plant Pathology, FOA Wadura, SKUAST-K	100 spawn bottles of button & dhingri mushroom	01-03-2019
18	DcTc Budgam	10 spawn bottles of dhingri mushroom	28-03-2019
19	Mohd Amin	60 spawn bottles of button mushroom	22-01-2019
20	Shabir Ahmad R/o Batamaloo	15 spawn bottles of Dhingri mushroom	25-03-2019
21	Mohd. Amin R/o Arabal Shalimar	50 spawn bottles of button mushroom	19-03-2019

2. A foreign national Ms Jessica from France visited the centre on 09-06-2018 in order to get first hand information regarding cultivation of Oyster and shiitake (*Lentinus edodes*) and its cultivation techniques. She was glad to see the work done on the cultivation of said mushrooms.

3. Dr. V.P Sharma Director and Principle Scientist Dr. Shwet Kamal from ICAR, DMR Solan visited the centre on 10-06-2018 and congratulated the whole team for work conducted under AICRP-Mushroom.

4. Dr. Yogesh Gautam Sr. Scientist (I/C AKMV-TOT) ICAR, DMR Solan visited the centre on
- 28-09-2018 as a course director for conducting of special training program for tribal farmers under TSP AICRP-Mushroom.

5. Dr. Dinesh Singh, Principal Scientist, Division of Plant Pathology, Indian Agricultural Research Institute (IARI), Pusa, New Delhi visited the centre on 14-06-2019.

Experiential learning

- Number of student . B.Sc Horticulture 22
- Gender wise distribution 6 female and 16 male students.



Fig. 6.65. Mushroom training and spawn supplied



Jorhat centre

Table 6.130. One day awareness training conducted

Training on	Date	Location	No.of Participants	Technology Demonstrated
Oyster Mushroom Cultivation	24.09.18	Dangdhara Sekuria, Titabar	39	Cultivation technology of oyster mushroom
-do-	25.09.18	Khamjogania, Titabar	23	-do-
-do-	15.02.18 & 25.02.18	Gendheli gaon, Jorhat (W)	22	-do-
Mushroom as a component of IFS	24.11.18	Directorate of Extn Education,AAU,Jorhat	20	Incorporation of Mushroom in IFS
Two-day Training on Mushroom cultivation	26-27.03.18	Dept. of Pl. Pathology AAU	30	Technology for oyster, Milky and Button mushroom

Table 6.131. Coverage in mass media

Participation in exhibitions	1. Annual Farmers’day at Sugarcane Research Station, AAU, Golaghat. 2. Annual Farmers’ day at Regional Agricultural Research Station, Titabar.
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Table 6.132. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
SS Infra, Elengi, Titabar	Oyster mushrooms	90 quintals

Table 6.133. Spawn supply

Item	Species	Supply (Kg/number)
spawn	Oyster	800 kg

Experiential learning

- Number of student: 47

- Gender wise distribution: Female: 23, Male: 24.



Fig. 6.66. Training Programme organized at AAU Jorhat

Mizoram Centre

Table 6.133. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
25/02/2019	34	24	10

Table 6.134. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
23/3/2019-25/03/2019	30	11	19

Table 6.135. Exposure visit of Farmers

Date of training	Number of farmers/students	Number of male participants	Number of female participants
7/01/2019	20	13	7
29/01/2019	15	9	6

Table 6.136. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Cloud 9 Hotel	Oyster	120 Kg

Table 6.137. Spawn supply

Item	Species	Supply (Kg/number)
spawn	Pleurotus sp.	35Kg



Fig 6.67. Training programme for Mushroom Cultivation



Fig 6.68. Various Mushroom Products Display at ICAR Krishi Unnati Mela, organized by ICAR, Mizoram Centre, Kolasib on 28th-29thJan, 2019



Port Blair Centre

Table 6.138. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
6 th December, 2018	25	16	9
8 th December, 2018	25	0	25-
13 th June, 2018	20	7	13

Table 6.139. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
28.08.2018 to 30.08.2018	53	1	52
08.10.2018 to 10.10.2018	31	5	26
22.01.2019 to 24.01.2019	28	0	28

Table 6.140. Coverage in mass media

1.	Participation in exhibitions	
2.	TV programmes	01
3.	Radio programmes	
4.	Farmers Scientists exhibition	01
5.	News paper coverage	03

Table 6.141. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
M/ Mahaalasa Agro Products	Oyster mushroom and spawn production	50 kg of mushroom per month 200 spawn per month
Mrs. Sita Rani Das, woman Farmer producing mushroom	Oyster mushroom	30 kg of mushroom per month

Table 6.142. Spawn supply

Item	Species	Supply (Kg/number)
Spawn	CIARI Mushroom varieties	325 nos
Master spawn	(<i>Peurotus</i> spp.)	
Culture tubes		

Demonstration

Front line demonstration on oyster mushroom production was demonstrated on paddy straw. The complete mycelial colonization were found within 15, days where as primordium initiation

and fruiting body formation were recorded within 20 & 24, days. The paddy straw substrate gave the maximum mushroom yield (715 g per 1 kg wet substrate) and this yield was significantly different from banana leaves (500 g per 1 kg wet substrate) which act as local check.



Fig. 6.69. Mushroom and Spawn training

Almora Centre

Table 6.143. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
23.12.2019 (National Mushroom Day)	57	32	25

Table 6.144. Three day training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
July 16-18, 2018	29	27	02

Table 6.145. Seven day/ long duration training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
Feb. 01-March 02, 2019	20	16	04

Table 6.146. Coverage in mass media

Participation in exhibitions	Institute’s farmers fair in April 2018 and Feb. 2019 where cultivation technology of button, oyster and <i>Macrocybe</i> were demonstrated.
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Table 6.147. Spawn supply

Item	Species	Supply (Kg/number)
spawn	<i>Agaricus bisporus</i> , <i>Pleurotus spp.</i> <i>Macrocybe</i>	271 Kg
Compost	109.71 Q.	

Experiential learning

- Number of students: Successfully imparted first hand training on Mushroom Cultivation and Management to Ms. Akshita Bisht from Feb. 01-May 20, 2019.
- Participation in seminar/symposia/workshop etc: Participated in XX Annual Workshop of AICRP on Mushroom at MPUA&T, Udaipur from May 04-05, 2018.



Fig. 6.70. Extension activities at Almora Centre

Meerut Centre

Table 6.148. One day awareness training conducted

Date of training	Number of participants	Number of male participants	Number of female participants
26.02.2019	46	40	06
06.03.2019	43	35	08
29.03.2019	50	45	05

Table 6.149. Participation in exhibitions

Year	No of Mushroom Units	No of particepants
2018	03	150

Table 6.150. Coverage in TV and Radio Programmes

Date	Place	Organiser	Topic
25.05.2018	Delhi	DD Kisan Channel	Mushroom utpadan avam prshikshn
28.08.2018	Delhi	DD Kisan Channel	Mushroom utpadan se badhaye aamdani
01..09.2015	Delhi	DD Kisan Channel	Mushroom farming (Hello Kisan)
30.03.2018	Nazibabad	Akash vani	Mushroom utpadan ek safal vyabsay
31.08.2018	Nazibabad	Akash vani	Mushroom utpadan kaise kare

Table 6.151. Farmers Scientists exhibition

Year	Invited Lectures on Mushroom	No of particepants
2018	4	200

Table 6.152. News paper coverage

Date	Particular	News Paper
24-12-2018	Krishi Vishvavidyalay Me Rashtriy Mushroom Divas Manaya	Hindustan pp-18
30-03-2019	Mushroom ki kheti se badegi kisano ki aay	Dainik Jagran pp-04
30-03-2019	Mushroom utpadan se bad sakti hai kisano ki aay	Amar ujjala pp-05

Table 6.153. Exposure visit of Farmers

Date	Number of farmers/students	Number of male participants	Number of female participants
18-12-2018	21	21	00
29-12-2018	18	12	06
09-01-2019	14	14	00
20-02-2019	06	06	00

Table 6.154. Consultancy Provided

Name of Firm	Type of mushroom cultivated	Production capacity per annum
Manyuk Mushroom Farm, Garh, Hapur.	Button , Oyster , Milky	50.0 Q.
Mushroom farm Bahadurgarh, Hapur	Button , Oyster , Milky	5.0 Q.

Table 6.155. Visit of dignitaries

Name of Visitor	Designation	Date of Visit
Dr. V. P. Sharma	Director, ICAR-DMR Solan (HP)	31-08-2018
Prof. Gaya Prashad	Vice chancellor, S.V.P.U.A&T. Meerut (UP)	11-02-2019

Table 6.156. Spawn supply

Item	Species	Supply (Kg/number)
spawn	Oyster	550
	Milky	60



Experiential learning

- Number of student : 18

- Gender wise distribution: M- 18, F-0

Participation in seminar/symposia/workshop
etc : 02



Fig. 6.71. Visit of dignitaries and trainings organized at Meerut centre



7. PUBLICATIONS

Bhubaneswar Centre

Research article:

- P. Hemalatha, K.B. Mohapatra, N. Nayak and N. Chinara. 2018. Growth pattern, fruit body characteristics and period of spawning on yield and yield attributing parameters of Indian oyster mushroom, *Pleurotus pulmonarius*. *International Journal of Current Microbiology and Applied Sciences*. 7(10):3632-3637.
- R.S. Mishra, N. Chinara and K.B.Mohapatra. 2018. Evaluation of plant extracts against sheath blight of paddy caused by *Rhizoctonia solani*. 3rd ARRW International Symposium on Frontiers of Rice Research for Improving Productivity, Profitability and Climate Resilience at ICAR - National Rice Research Institute, Cuttack (Odisha), India from February 6-9, 2018. Pp. 358.

Popular articles:

- Chinara, N. and Mishra, M.K. 2018. Role of mushroom in rural agriculture. Chasir Sansar, Directorate of Extension Education, OUAT, Bhubaneswar(ISSN:2394-675X),pp.49-50.
- Chinara, N.2018.Mushroo cultivation and processing . Compendium on Technology based entrepreneurship Development Programme, 10-15 September, 2018. ICAR-NRRI, Cuttack, pp:38-40.
- Chinara, N.2019. Commercial cultivation of of Paddy straw mushroom.Training manual of Winter school on “ Dynamic entrepreneurial development for empowering Rural Youth in Agriculture” from 7-27February, 2019. Department of Extension Education, OUAT, Bhubaneswar.

Paper presented in seminars/symposia:

- N. Chinara, S.K.Beura, R.K.Pattnaik, and B.S. Nayak. 2018. Seed treatment- cost effective management measure against Alternaria leaf spot disease of cotton. 5th National Symposium on “New Dimensions in Plant Protection-A Step towards Food and Nutritional Security and Environmental Safety” at OUAT, Bhubaneswar from 27-28th October, 2018. Pp.163-164.
- Prusty, J., Sahoo, S., Mohapatra, B. and Chinara, N.2018.Evolution of paddy straw cutter machine in paddy straw mushroom cultivation. National seminar on “Science for Society” organised by Orissa environmental Society, Bhubaneswar and National Institute of Science Education and Research, Bhubaneswar from 17-18, November, 2018. Pp. 183.
- N. Chinara, M. K. Mishra and G. Biswal. 2019. Women empowerment through mushroom cultivation training”. National Seminar on “Role of women in Agricultural Production and Marketing” at OUAT, Bhubaneswar from 8-9th January, 2019, pp.20.

Thesis guided:

- Studies on diversity of insect pollinators of Mango (*Mangifera indica* L.) under coastal Odisha condition.
- Performance of *Hypsizygus ulmarius* under South East Coastal zone of Odisha.
- Quality improvement in spawn production of straw mushroom.



Newspaper articles

- N. Chinara. Paddy straw mushroom cultivation. Dharitri News paper on 30.5.2018 page16.

Pune Centre

Research Papers

- B.C. Game, C.D. Deokar and A.C. Jadhav. 2018. Characterization of Cellulolytic Microorganisms Associated with Naturally Decomposing Waste Material. *Int. J. Curr. Microbiol. App. Sci.* 7(4): 1710-1719.
- Balgude, Y.S. and **A.P. Gaikwad**. 2019. Integrated management of blast of rice. *International Journal of Chemical Studies*. 7(1): 1557-1563.
- Balgude, Y.S., C.R. Kshirsagar and **A.P.Gaikwad**. 2019. Evaluation on the Efficacy of Modern Fungicides against Blast and Sheath Rot of Rice. *Int.J.Curr.Microbiol.App.Sci.* 8(03): 83-88

Popular articles:

- डॉ अनिल प. गायकवाड आणि डॉ. युवराज सोबालगुडे, भातावरील रोगांचे एकात्मिक व्यवस्थापन डिजिटल बलीराजा दि. 24-06-2019

Paper presented in seminars/symposia:

- A.P. Gaikwad, A. C. Jadhav, V. K. Bhalerao, M. C. Dhavale and N. G. Deasai. 2019. Diversity of Wild Edible Mushrooms in Maharashtra. Abstracts of National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption, at Integrated Mushroom R&D Project HAIC Agro R&D Centre, Murthal (Haryana) held during 31st January to 2nd February 2019. Pp. 17.

- M. C., Dhavale, A. P Gaikwad, V. K. Bhalerao, A. C. Jadhav and N. G. Deasai. 2019. Growth and Yield Performance of the Selected Edible Oyster Mushroom (*Pleurotus* spp.) on Wheat Straw. Abstracts of National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption, at Integrated Mushroom R&D Project HAIC Agro R&D Centre, Murthal (Haryana) held during 31st January to 2nd February 2019. Pp. 25.
- Desai, N. G., V. K. Bhalerao, A. P. Gaikwad and M. C. Dhavale. 2019. Fostering entrepreneurship quality in farmers: an insight of mushroom cultivation trainings. Abstracts of National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption, at Integrated Mushroom R&D Project HAIC Agro R&D Centre, Murthal (Haryana) held during 31st January to 2nd February 2019. Pp. 65.

Thesis guided:

- Dr. A. P. Gaikwad Guiding two M.Sc. (Plant Pathology) students for Post Graduate research work.
- Dr. A. C. Jadhav Guiding two M.Sc. (Agril. Microbiology) students for PG research work

Academic activities

- Dr. A. P. Gaikwad teaching course No. Course No. Path 503 - Plant Bacteriology (credits:2+1=3) Course No. AEL-PATH-486-Mushroom Production (credits:0+20=20)
- Dr. A. C. Jadhav teaching MICRO - 502 (3+1), MICRO-505 (2+1) and Course No. AEL-PATH-486-Mushroom Production (credits:0+20)



Awards

- **Mrs. M.C. Dhavale** received Consolation Prize for Poster presentation for the paper entitled "Growth and yield performance of selected wild edible oyster mushroom (*Pleurotus* spp.) on wheat straw " autherd **by M.C. Dhavale, A.P. Gaikwad, A. C. Jadhav and N.G. Desai** in National Symposium on "Trends and Innovations in mushroom Production Technologies, Diversification, Processing and Consumption" held at HAIC, R & D Centre, Murthal, Haryana during 31st Jan. to 2nd Feb, 2019.

Nauni Centre

Book chapters

- Gupta Dharmesh, Savita Jandaik and V Pullareddy.2018. Alternative approaches for the management of diseases of button mushroom. *In*: Alternative Approaches in Plant Disease Management (Satish K Sharma and HR Gautam, eds.) Neoti Book Agency Private Limited, New Delhi. pp: 380-422.
- Jandaik Savita , Dharmesh Gupta and Rajender Jarial.2018.Nutritional factors affecting quality and quantity of sporophore production in oyster mushroom. *In*: Alternative Approaches in Plant Disease Management (Satish K Sharma and HR Gautam, eds.) Neoti Book Agency Private Limited, New Delhi.pp:423-438.

Thesis Guided:

- M.Sc thesis on Molecular identification of *Ganoderma* species and studies on their bio-efficiency, antioxidant and antibacterial properties By- V. Pulla Reddy

Academic activities:

- **Undergraduate Courses on** Mushroom cultivation (0+10), Fundamentals of plant

pathology (2+1) and Industrial Training in mushroom (0+3)

- **Post graduate Courses** on Mushroom Production Technology (2+1), Principles of plant pathology (3+0), Principles of plant disease management (2+1), Master's seminar (1+0) and Doctoral seminar (1+0)

Pusa Centre

Popular articles

- डॉ. दयाराम एवं प्रीती सुमन (2018) : मशरूम उत्पादन एवं प्रसंस्करण से महिलाओं का सशक्तिकरण। आधुनिक किसान, अक्टूबर-मार्च, 2018 पेज नं० 11-15.

Paper presented in seminars/symposia:

- Dayaram, Suman P. and K.R. Meena (2019) Income and employment generation through mushroom production technology in India. Paper presented in National Symposium on "Trends & Innovations in mushroom production technology is diversification, processing & consumption" held on 31st January to 2nd February, 2019 at HAIC Agro R&D Center, Muthal, Haryana.
- Suman, P. and Dayaram (2019) Innovation in mushroom production technology. Paper presented in "Trends & Innovations in mushroom production technology is diversification, processing & consumption" held on 31st January to 2nd February, 2019 at HAIC Agro R&D Center, Muthal, Haryana.

New Mushroom Center

- New mushroom center inaugurated at Tirhut College of Agriculture, Dholi, Muzaffarpur.
- Activitiy- Spawn production, Training and Product Development.



Ranchi Centre

Popular Articles:

- Maurya S, Kumar P. R., Pan R. S., Singh A. K., Das B. and Bhatt BP, 2018. Mushroom enterprise: A collective effort towards empowerment. Leisa India, 20 (3): 13-15.

Technology Transfer:

- All India Radio Series (serials) on Mushroom cultivation, Marketing to value addition (A total eighteen episode (18) regularly broadcasted in every Sunday in Krishi Jagat Programme, till date 12 episodes were broadcasted and few will be broadcasted on coming Sunday.
- Milky mushroom cultivation: Programme for Krishi Darshan , Ranchi Doordarshan, Jharkhand

Award and Recognition:

- Popular Extension worker award and Distinguish Scientist Award received for outstanding contribution in the field of 'Plant Pathology in 'National Conference on Doubling farmers Income for Sustainable and Harmonious Agriculture (DISHA-2018)' at Ranchi on dated August 11-12, 2018

Workshop/ Seminar/Symposium/Training Attended: 02

- Presented progress reports of Research and Extension activities of Mushroom of the Centre in 'XXth Annual AICRP on Mushroom Workshop' at Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan on dated 4-5 May, 2018.
- Presented a paper on 'Pleurotus mushroom cultivation A potential option for enhancing farmer's income in Jharkhand' in National Conference on doubling farmers income for

sustainable and harmonious agriculture (DISHA-2018) at Ranchi on dated August 11-12, 2018.

Udaipur Centre

Research papers: Two

Popular Articles: One

Technical bulletin: One

Paper presented in seminars/symposia: Two

Thesis Guided:

- Dr.Vinita Dahima, Ph.D 2018 Completed "Investigation on indigenous edible mushroom *Pleurotus pulmonarius* and its antimicrobial activities in comparison with *pleurotus florida* and *Schizophyllum commune*"
- Mahendra Singh Meena, Ph.D 2018 Ongoing "Bioremediation of Heavy Metals through *Lentinus squarrosulus* (Mont.) Singer and *Pleurotus pulmonarius* (Fr.) Quel. Champ."
- Dilbag Saran, M.Sc 2018 Completed "Investigations on Factors affecting growth and cultivation of Mushroom *Lentinus squarrosulus* Mont (Singer)"
- Miss Akansha Deora, M.Sc 2018 Completed "Standardization of Cultivation Technology of King Oyster (*Pleurotus eryngii*) mushroom in Rajasthan."
- Miss Sarita Kumhar, M.Sc 2018 Ongoing " Evaluation of Different Strains of Oyster Mushroom in rainy and Winter Season for Higher yield and Comparative Nutritional Value."

Academic activities: Two IDP Trainings

News paper articles: Twenty six



Coimbatore Centre

Research papers:

- Thiribhuvanamala, G., M.Bharathiraja , D.Amirtham and K.Rajamani. 2018. Exploitation of Vetiver (*Chrysopogon zizanioides* L.) shoot biomass for production of oyster mushrooms *Medicinal Plants International Journal of Phytomedicines and Related Industries*.10 (2), p.133-137
- Jeeva S, Krishnamoorthy. A.S, 2018. Antifungal Potential of Myco-molecules of *Coprinopsis cinerea* (Schaeff) S. Gray s.lat. against *Fusarium* spp., Madras Agric. J., 105(1-3) : 56-60
- Praveen T, Reihana R, Parthiban V.K, Ramamoorthy V, 2018. Molecular Characterization and Phenotypic Study of New *Pleurotus djamor* Isolate KKM1, International Journal of Current Microbiology and Applied Sciences,7(8):3574-3582
- Sangeetha C, Krishnamoorthy. A.S, Kiran Kumar N, Arumuga Praveen I, 2018. Effect of Headspace and trapped volatile organic compounds (VOCs) of the Chinese Caterpillar Mushroom, *Ophiocordyceps sinensis* (Ascomycetes) against Soil- borne pathogens, International Journal of Medicinal Mushrooms, 20(9):825-835
- Priyadharshini Bhupathi, Akkanna Subbiah Krishnamoorthy, Sivakumar Uthandi, 2017. Profiling of morphogenesis related enzymes of milky mushroom *Calocybe indica* (P&C), Journal of Pharmacognosy and Phytochemistry, 6(5):2537-2543

Books:

- Revathi,K., Baranitharan,K., Thiribhuvanamala, G., Tilak, M., and Karthick, V. Gokul, R, Dayanathan, M. and

K.K.Suresh.2017. Importance of Non forest products (In Tamil) (ISBN No. 978-93-84234-39-3) 167p.

Book Chapters:

- Thiribhuvanamala, G. and M.Tilak.2018. Commercial production techniques for protein rich non forest product- the Mushrooms. (In Tamil). In: Importance of Non forest products (Eds. Revathi *et.al.*), Laser Park Publishing House, Coimbatore.pp.79-110 (ISBN No. 978-93-84234-39-3),pp:79-110

Paper presented in seminars/symposia:

- *In vitro* screening of volatiles of certain basidiomycetes fungus against *Fusarium oxysporum* f.sp. *lycopersici* and *Pythium* sp in tomato(T. Praveen)
- Standardization for effective growth of *Ophiocordyceps sinensis* under invitro condition(S. B.Akshaya)
- Inhibitory potential of bioactive molecules of *Ophiocordyceps sinensis* against plant pathogens(C. Sangeetha)
- Activity of metabolites from mushroom fungi against *Colletotrichum capsici*, the chilli anthracnose and fruit rot pathogen of chilli (K. Priya)
- Best Poster Presentation Award was received by T.Praveen, S.B.Akshaya, C.Sangeetha for the topics *In vitro* screening of volatiles of certain basidiomycetes fungus against *Fusarium oxysporum* f.sp. *lycopersici* and *Pythium* sp in tomato (T. Praveen), Standardization for effective growth of *Ophiocordyceps sinensis* under invitro condition(S. B.Akshaya), Inhibitory potential of bioactive molecules of *Ophiocordyceps sinensis* against plant pathogens (C. Sangeetha)



Thesis Guided /Academic activities/ Students research work:

Ph.D (Plant Pathology)

- Studies on genetic variability, morphogenesis and fruiting body architecturing of milky mushroom (*Calocybe indica* P &C) (B.Priyadharshini) (2015-18)
- Harnessing the antifungal properties of hexanal and mycomolecules against post harvest pathogens of Mango and Banana (I.Arumuga Praveen) (2015-2019)
Formulation of Microbial Molecules against *Fusarium* nematode complex in Cucumber and Capsicum (K.Akshaya) (2016-2019)
- Bioprospecting with antiviral phyto and microbial molecules against RNA viruses (B.Sangeetha) (2016-2019)
- Volatilomes Mediated Defense against Damping off and Wilt Pathogens of Tomato under Protected Cultivation (K.Praveen) (2017-2020)

M.Sc.(Ag.)Plant Pathology

- Characterization of antimicrobial compounds from mushroom fungi and medicinal plants against chilli fruit rot pathogen, *Colletotrichum capsici* (Ms.K.Priya, 2018-19)
- Bioactive molecules from mushroom fungi against post harvest anthracnose fruit rot of mango caused by *Colletotrichum gloeosporioides* (Ms.K.Gayathiri , 2019 -20)

UG Project

- Bioactive compounds from *Ganoderma lucidum* against foliar and soil borne pathogens of *Gloriosa superba* (2018-19)

Teaching courses handled:

Under Graduate

- Commercial production of mushrooms (0+5)

- Fundamentals of Plant Pathology, Nematology nad Disease Management (2+1)
- Principles of Plant Pathology (2+1)

M. Sc.(Ag). Plant Pathology

- Plant Bacteriology (2+1)

Ph.D: (Plant Pathology)

- Molecular basis of host pathogen Interaction (2+1)
- Advanced Bacteriology

Barapani

Research articles:

- Anup Das, Utpal Dey, Baiswar P, Rachna Pande, Ramkrushna GI, Jayanta Layek, Dauni Suting, Subhash Babu, Gulab Singh Yadav and N. Prakash. 2018. Development of spray schedule involving commercial and indigenous biopesticides for insect pest and disease management in soybean crop. *Innovative Farming*: 3(1)11-18.
- Veerendra Verma, Anjani K Jha and Baiswar P. 2018. Studies on yield and economics of high value vegetable crops grown under low-cost polyhouse in the mid-hill conditions of Meghalaya. *Indian J. Hort.* 75(4): 631-638.
- Dhamala S, Patra P, Thakuria D, Baiswar P, Prabha Devi M, Ningthoujam K. 2018. Toxicity effect of some insecticides on spiders and coccinellids in Brinjal and Cabbage ecosystem. *Indian Journal of Hill Farming*. 31: 183-187.
- Momin GC, Firake DM, Behere GT and P. Baiswar. 2018. Pest complex, biology and population dynamics of insect pests of Ginger in Northeast India. *Indian Journal of Entomology*. DOI : 10.5958/0974-8172.2018.00077.9.



International/National Symposium Presented/attended/organized

- National Symposium and Annual meeting of Indian Society of Plant Pathologists, 25-27 Oct, 2018 held at ICAR Research Complex for NEH Region, Umiam, Meghalaya.
- National Conference cum Krishi Unnati Mela- 2018 on "Approaches for doubling Farmers' Income- The road ahead for farmers' prosperity"., Nov 17-18, 2018 at Namsai, Arunachal Pradesh.
- International Conference on Sustainable Organic Agri-Horti systems, 28-30 Nov, 2018 held at Lucknow, Uttar Pradesh.
- National Symposium on recent challenges and opportunities in sustainable plant health management, 26-28 Feb, 2019 held at BHU, Varanasi.
- National Agribusiness Entrepreneurship Conclave "Building Agri-Business Start-Up Ecosystem", 9-11 Feb, 2019 held at ICAR Research Complex for NEH Region, Umiam, Meghalaya.

Newspaper clippings:

- The Shillong Times: Field Day celebration at ICAR (Short method of composting), published on 13.10.2018.
- The Mawphor: Hikai ka ICAR ——— ka sboh rep tit: published on 15.10.2018.

Electronic media:

- On KIRAN website "Mushroom day on the theme- Mushroom in vertical farming"
- On KIRAN website "Field day on short method of composting"
- On KIRAN website "Field day on Oyster mushroom cultivation"

- On KIRAN website "Field day on Oyster mushroom cultivation"
- On KIRAN website "Mushroom cultivation for doubling farmers income"

Jorhat (Assam)

Technical bulletins: One on milky mushroom is under preparation.

Thesis Guided:

Submitted: 1

Continuing: 7 (M.Sc.= 4, Ph.D.=3)

Academic activities:

Courses taken: 7

Ludhiana

Research Papers:

- Keshani, Sharma S, Kanwar SS, Khanna PK and Kapoor S (2018) Region based diversity studies of *Saccharomyces cerevisiae* and *Lentinula edodes*. *International Journal of Current Microbiology* 7(7): 3702-3713.
- Anna Goyal, Anu Kalia and HS Sodhi (2018) Profiling of intra- and extracellular enzymes involved in fructification of the Lingzhi or Reishi medicinal mushroom, *Ganoderma lucidum* (Agaricomycetes). *International Journal of Medicinal Mushrooms*, 20 (12):1209–1221(NAAS 7.12)

Popular Articles:

- Kapoor S and Shivani Sharma (2018) Cultivation of summer mushrooms using wheat and paddy straw. *Progressive Farming* 54(3): 29-31.
- Kapoor S and Shivani Sharma (2018) Turi ate parali di varton rahin garmi dian khumban di kasht. *Changi Kheti* 54 (3): 29-30



- S Kapoor, Shivani Sharma and H S Sodhi (2018) Utilize paddy straw as substrate for mushroom cultivation. *Progressive farming* 54(9): 22-23.
- S Kapoor, Shivani Sharma and H S Sodhi (2018) Khumban paida krn lvi sasta sadhan parali. *Changi Kheti* 54 (9): 22-23.

Abstracts in Conferences/Symposia:

- Sukhmandeep Kaur, Preetiman and S Kapoor (2019) Utilization of paddy straw and maize stalks based compost formulations for *Agaricus bisporus*. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 11.
- Karanpreet Singh, Shivani Sharma, Balwinder Singh and HS Sodhi (2019) Strain evaluation of milky mushroom, *Calocybe indica* (Pur. and Chan.) in Punjab. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 23.
- Swathi K, Shivani Sharma, Suman Kumari and HS Sodhi (2019) Pretreatment of paddy straw for cultivation of *Volvariella volvacea* (Bull. ex Fr.) Singer. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 15.
- Samandeep Kaur and Shivani Sharma (2019) Bacterial pretreatment of wheat straw and paddy straw as a substrate for enhancing the yield of *Pleurotus* spp. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 19.

- Mehakpreet Kaur, Shivnam Rana and S Kapoor (2019) An alternative wheat straw and maize stalk based compost formulation for *Agaricus bisporus*. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 11.
- Ravneet Kaur, Manmeet Kaur and H S Sodhi (2019) Effect of Salicylic acid on the browning in button mushroom *Agaricus bisporus*. National Symposium on Trends and Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption. HAIC Agro R&D Centre, Murthal, 31 Jan-2 Feb 2019, Pp 54.

Book Chapter:

- Priya Katyal and Shivani Sharma (2019) Emerging Alkaloids against Cancer: A peep into factors, regulation and molecular mechanisms. *Bioactive Natural Products for the Management of Cancer from Bench to Bed Side*. Springer

Nagaland

Book Chapters:

- Rajesha G and Mekrulou Mero. 2018. Mushroom cultivation: A Potential subway for rural enterprise development. (*In Development of Agri-Entrepreneurship in NEH Region: A way for doubling the farmer's income*). Published by ICAR Research Complex for NEH Region, Nagaland Centre, Medizphema. pp106-113.
- Rajesha G. 2018. Mushroom cultivation for doubling the farmers income in north east India. (*In recent advances in natural resource management for doubling farmers income under changing climate scenario*). Published by ICAR-NRCM, Medizphema. pp 80-87.



Popular articles:

- Rajesha G. 2018. Entrepreneurship development through spawn production and mushroom cultivation. (<https://icar.org.in/content/entrepreneurship-development-through-spawn-and-mushroom-production-nagaland>).

Technical bulletins;

- Rajesha G., Lireni Kikon, Shwet Kamal, Christy B. K. Sangma, Ph Romen Sharma and D. J. Rajkhowa. 2019. "Mushroom spawn production technology". ICAR Research complex for NEH region, Nagaland centre, Medziphema. Pp 22.

Folders:

- Rajesha G., Bendangsenla Ph Romen Sharma, Lireni Kikon Mahlo Thungo and D. J. Rajkhowa. 2018. Oyster Mushroom Banabo Laga Tarika (Oyster Mushroom Cultivation).
- Rajesha G., Susheel Kumar Sharma, Bendangsenla and D. J. Rajkhowa. 2018. Cultivation of Shiitake mushroom cultivation in synthetic logs.
- Rajesha G., Bendangsenla Ph Romen Sharma, Lireni Kikon Mahlo Thungo and D. J. Rajkhowa. 2018. Oyster Mushroom Cultivation.

Paper presented in seminars/symposia:

- Rajesha G., Bendangsenla, Tasvina R. Borah D. J. Rajkhowa, and N. Prakash. 2018. Evaluation of effective bacterial endophytes against major soil borne diseases of king chilli. In National symposium on role of plant pathology in empowering and doubling farmers's income held in ICAR Research Complex for NEH Region, Umiam, Meghalaya during 25-27 October, 2018. Pp46.

Srinagar

Research articles:

- Shaheen Kausar, Shaista Shah and M.D. Shah 2018. Efficacy of fungicides against *Mycogone perniciosa* causing wet bubble disease of white button mushroom (*Agaricus bisporus*) in Kashmir International Journal of Advance Research in Science and Engineering Vol No.07, Special Issue No.(04). ISSN(O): 2319-8354, ISSN(P): 2319-8346.
- Shaheen Kausar, Shaista Shah and M.D. Shah. 2018. Evaluation of bacterial antagonists against *Mycogone perniciosa* causing wet bubble disease of white button mushroom (*Agaricus bisporus*) in Kashmir. *International Journal of Microbiology Research*.
- Shaista Shah, Shaheen Kausar and Shaista Qadir. 2018. Mycoflora associated with Oyster mushroom (*Pleurotus ostreatus*) cultivation at M.R.T.C in Kashmir. International Journal of Advance Research in Science and Engineering Vol No.07, Special Issue No.(04). ISSN(O): 2319-8354, ISSN(P): 2319-8346.
- Suhail Altaf, TR Rather, Sajad Ahmad Rather, Shaheen Kousar and NA Khan. 2018. Status of entomosporium leaf and fruit spot disease of pear (*Pyrus communis* L.) in Kashmir valley. *J. of Pharmacognosy and Phytochemistry* 2018; 7(5): 635-638
- Suhail Altaf, TR Rather, Shaheen Kousar, NA Khan and ZA Bhat. 2018. Symptomatology and morphological, cultural characterization of Entomosporium leaf and fruit spot disease of pear (*Pyrus communis* L.). *Journal of Pharmacognosy and Phytochemistry* 2019; 8(1): 1277-1280.
- Suhail Altaf, TR Rather, Tabbasum Iqbal, Shaheen Kousar and NA Khan. 2018. Efficacy



of fungicides for entomosporium leaf and fruit spot disease of pear (*Pyrus communis* L.). *Journal of Pharmacognosy and Phytochemistry* 2018; 7(4): 3342-3344

- T.A.Wani, G.N.Bhat, M.Ahmad, Ali Anwar and G.Zaffar. 2018. Screening of maize germplasm for Turcicum leaf blight resistance. *Journal of Applied and Natural Science*,10(1):98-101
- Varsha Bharti, Shaheen Kausar, Shazia Paswal and Seethiya Mahajan. 2018. Effects of anti-browning agents on biochemical composition of summer white button mushroom, *Journal of Pharmacognosy and Phytochemistry* 7(2): 466-470.

Paper presented in seminars/symposia:

- National Seminar on climate change and its impact on Himalyan Ecology and Food security. SKUAST-K, Shalimar, 13-14 Mar. 2019
- International Conference on Recent developments in Science, Humanities and Management. Amar Singh College, Cluster University, Srinagar, Kashmir. 17-18 Apr, 2018

Bangalore

Popular articles:

- Meera Pandey, Chandrashekara C. and G. Senthil Kumaran, 2019 (feb), Bele tyajyadinda aahara uthpadane (Kannada). *Krishi Jagarane*, page: 22-25 (Febraury), 2019.

Folders:

- Chandrashekara C., Meera Pandey and G. Senthil Kumaran. 2018, A Glimpse. ICAR-IIHR folder No.102., ICAR-IIHR, 4pp.

Technical bulletins:

- Meera Pandey, G. Senthil Kumaran and Chandrashekara C., 2018, Crop Waste to Food Plate. Technical Bulletin No.72. 8pp.

- Meera Pandey, Chandrashekara C. and G. Senthil Kumaran, 2018, Know your mushrooms (English). Technical Bulletin No.76. 8pp.
- Meera Pandey, Chandrashekara C. and G. Senthil Kumaran, 2018, Nimma anabegala bagge tilidukolli (Kannada). Technical Bulletin No.77. 8pp.
- Meera Pandey, Chandrashekara C. and G. Senthil Kumaran, 2018, खुम्बों को जानिए और पहचानिए, A Technical Bulletin No.78. 8pp.
- B, Hanumanthegowda, P. Nandeesh and Chandrashekara C., 2019, Raitha snehii krishi yojanegala kaipidi, Technical Bulletin No. TB 01. 2019, 68pp.

Paper presented in seminars/symposia:

- Attended and presented Oral presentation on 'Domestication of new indigenous wild mushroom species to increase the diversity of Indian Mushroom Industry' from 31st January to 2nd February 2019 at 'National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption' Integrated Mushroom R&D Project HAIC Agro R&D Centre, Murthal. pp.

Hisar

Popular article:

- Rakesh Kumar Chugh, Satish Kumar and Surjeet Singh (2018). Kaise ugayein dhingri mushroom. *Krishi Samvad3* : 22-23.

Leaflet:

- Uma Devi, Pawan Kumar, Satish Mehta, Dheeraj Panghal, Samunder Singh and Gulab Singh 2019.Khumb Utpadan – Lagat Kam Amdani Jyada, Department of Agronomy, CCS Haryana Agricultural University, Hisar.



Papers presented in the symposium:

- Satish Kumar, Rakesh Kumar, Ashwani \Kumar, Surjeeet Singh and R.S. Kanwar. 2019. Status of different diseases and nematodes of button mushroom in Haryana. Paper presented in National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption held on 31st January to 2nd February 2019 at Integrated Mushroom R & D Project HAIC R & D Centre, Murthal (Haryana).
- Rakesh Kumar, Satish Kumar, Surjeet Singh and Anil Kumar. 2019. Effect of spent mushroom substrate on yield, gummosis and collar rot of bottle gourd. Paper presented in National Symposium on Trends & Innovations in Mushroom Production Technologies, Diversification, Processing and Consumption held on 31st January to 2nd February 2019 at Integrated Mushroom R & D Project, HAIC R & D Centre, Murthal (Haryana).

Academic activities:

- AICRP Mushroom -Hisar guiding one M.Sc. student on Lion Maine Mushroom
- Taught UG and PG courses on Mushroom
- AICRP Centre in collaboration with KVKs established 270 mushroom units in SC/ST families of Haryana.
- The centre attended T&V and ZREAC meetings on regular basis.
- The centre established liaison with PNBFTC, Sachakhera, Department of Horticulture, Agriculture, HAIC, SNITTE etc.and imparted trainings and delivered lectures.

Jammu

Research papers:

- Gupta, S., Prakash, O., Annepu, S.K., Gupta, M. and Singh, R. 2018. Growth, yield and

nutritional composition of *Pleurotus sapidus* and *P. florida* grown on chemically pasteurized substrate. *Mushroom Research* **27**: 63-69.

- Gupta, S., Summana, B., Wali, A. and Gupta, M. 2018. Mushroom: Reliable protein source in the future. *Asia-Pacific Journal of Food Safety and Security* **4**: 45-52.

Book Chapters:

- Gupta, S., Annepu, S.K., Summana, B., Gupta, M. and Nair, S.A. 2018. Role of mushroom fungi in decolourization of industrial dyes and degradation of agrochemicals. In "B. P. Singh et al. (eds.), *Biology of Macrofungi, Fungal Biology*. Springer Nature Switzerland. pp 177-190.
- Gupta, S., Summana, B., Singh, R., Gupta, M. and Gupta, A. 2018. Mushroom Diseases: A potential threat to mushroom cultivation. In "Ahmad, S. and Sharma, J.P. (eds.) *Transformation of Indian Agriculture through innovative technologies*". Astral International Pvt. Ltd. N.Delhi. 57-70 pp.

Chapter in Compendium:

- Gupta, S., Bharti, V and Singh, R. 2018. Spawn Production Technology. In "Compendium of lectures on the training programme on "Training Programme on Spawn Production Technology" held at SKUAST-J w.e.f. 27-28th Sep., 2018. pp. 1-8.
- Singh, R., Gupta, S. and Singh, S.K. 2018. Sub Culturing and maintainence of cultures. In "Compendium of lectures on the training programme on "Training Programme on Spawn Production Technology" held at SKUAST-J w.e.f. 27-28th Sep., 2018. pp. 9-15.
- Dutta, U. and Gupta, S. 2018. Preparation of culture media. In "Compendium of lectures on the training programme on "Training Programme on Spawn Production Technology" held at SKUAST-J w.e.f. 27-28th Sep., 2018. pp. 16-20.



- Gupta, S and Singh, R. 2018. Spawn Production. In "Compendium of lectures on Model Training Course on Entrepreneurship development through Spawn production and Mushroom Cultivation" held at SKUAST-J w.e.f. 19th to 26th Dec., 2018. pp. 7-11
- Gupta, S. 2018. Mushroom Biology. In "Compendium of lectures on Model Training Course on Entrepreneurship development through Spawn production and Mushroom Cultivation" held at SKUAST-J w.e.f. 19th to 26th Dec., 2018. pp. 17-18.

Paper presented in seminars/symposia:

- Gupta, S., Bharti, V. and Gupta, A. 2018. Cultivation and cropping of *Macrocybe gigantea* in Jammu subtropics. In "Proceedings of National Symposium on Mushrooms" held at HAIC R&D Centre, Murthal w.e.f 31st January to 2nd February, 2019. pp. 47.
- Gupta, S., Bharti, V and Gupta, A. 2019. Standardization of media, temperature and hydrogen ion concentration for the growth and antimicrobial activity of mycelia culture of *Macrocybe gigantea*. In "Abstract book of National Conference on Women Empowerment through Agro-Entrepreneurship for livelihood security" organized at SKUAST-J from 7th to 8th Feb., 2019. pp. 117.
- Kumar, R., Gupta, A., Gupta, S. and Salathia, P.S. 2019. Adoption of mushroom cultivation by women self help groups In "Abstract book of National Conference on Women Empowerment through Agro-Entrepreneurship for livelihood security" organized at SKUAST-J from 7th to 8th Feb., 2019. pp. 154.

Thesis Guided:

- Ph.D Thesis submitted by Varsha Bharti (J-15-D-237-A) on the topic "Standardization of

Cultivation Technology of *Macrocybe gigantea* (Massee) Pegler and Lodge" under the supervision of Dr. Sachin Gupta

Academic activities:

- Taught UG course PATH- 516 on Mushroom Cultivation (2 + 1) and PG course PATH-413 on Mushroom Cultivation (0+ 2)

Pantnagar

Research papers:

- Sudha Nandni and Mishra SK 2018. Crop room studies in relation to yield potential of *Lentinula edodes* strain on wheat straw. *Journal of Hill Agriculture*. 9 (1): 124-126.
- Sudha Nandni and Mishra SK. 2018. Standardization of cultural conditions in vitro for the maintenance of *L. edodes* strains. *Journal of Pharmacognosy and Phytochemistry*. 7 (3): 1510-1512.
- Singh HN, Raghav M, Singh B, Kushwaha KPS, Singh YV, J, Ruhela A and Pal VK 2018. Integrated Farming System and Human Resource Planning and Management for Livelihood Security and Capacity Building of Tribal Farming Community in District Dehradun. *Agricultural Research & Technology*. 17 (1): 1-3.
- Nayak, Harapriya Kushwaha, Archana Shahi NC, Khan Chand, Kushwaha KPS, Kulshrestha Kalpana and Chopra CS. 2018. Effect of drying parameters on water activity of pink oyster mushroom (*Pleurotus djamor*) Powder. *Journal of Pharmacognosy and Phytochemistry*. 7 (2): 2288-2292.

Book Chapters:

- Mishra SK and Singh R. 2018 Role of Mushroom cultivation in sustainable agriculture and entrepreneurship In: Sustainable Agriculture for food Security



Concept and Approaches. (eds.B.Kumar and R Singh) Biotech Books. New Delhi. 190-204.

Popular articles:

- Kushwaha K.P.S. Kushwaha Arun, Kuhswaha Kiran, ans Mishra S.K. 2018. Mushroom se Banana vale khadya Padarth tatha unka labh. 8: 37-40.

Thesis Guided: M.Sc. Thesis

- Improving the Mycellation Process of *Lentiula edodes* (Break) Pegler with Organic Substrates and Supplements.
- Impact of Physical & Chemical Treatments on the Growth & Yield of *Pleurotus* spp.

Academic activities:

- ELP on Mushroom Cultivation (APP 381)
- Mushroom Production Technology (APP 517)

New paper articles: 01

Pasighat

Popular articles:

- R. C. Shakywar. 2019. Mushroom Farming: a venture of small farmer of North East Region of India. In Souvenir- Arunachal AGRI EXPO- 2019 (February 25-27, 2019). Organized by College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh. pp. 137-145.

Technical bulletins/ Training manual:

- R. C. Shakywar, D. B. Ahuja, B.N. Hazarika and M. Pathak 2018. *Scientific Mushroom Cultivation*. Published by College of Horticulture and Forestry, CAU, Pasighat – 791 102, Arunachal Pradesh.Pp-126.

Folders: 03

Sikkim

Technical bulletins:

- Yadav Ashish., Dutta Sudip Kumar, Avasthe R.K., Singh Matber, Kapoor Chandan, Das S.K., Raj Chandramani and Singh Shweta. 2019. Organic horticulture- better option for doubling farmers income. In: Souvenir Technological Intervention in Organic Farming for Doubling Farmer's Income during Sikkim Organic Day cum Krishi Unnati Mela Jointly organized by ICAR-NOFRI, Tadong, Gangtok; FS&ADD and H&CCDD, Govt. of Sikkim from January 17-18, 2019. Pp 62-69.
- Singh Shweta, Raj Chandramani and N. Johnson Singh. 2018. Practical demonstration of mushroom and mushroom spawn production techniques in Technology Compendium on Organic Production of Horticultural crops in Sikkim for Doubling Farmers' Income (Ed) Yadav Ashish, Avasthe, R.K., Singh, R. and Islam, R. ICAR-NOFRI, Tadong-737102, Gangtok, Sikkim. pp 207-213.
- Singh N. Johnson, Singh Raghvendra, Gopi R, Pathak P K, Lepcha B., Raj Chandramani and Singh Shweta. 2018. Mushroom cultivation: an approach for livelihood and nutritional security in Technology Compendium on Organic Production of Horticultural crops in Sikkim for Doubling Farmers' Income (Ed) Yadav Ashish, Avasthe, R.K., Singh, R. and Islam, R. Yadav Ashish, Avasthe, R.K., Singh, R., Singh, M. and Islam, R. ICAR-NOFRI, Tadong-737102, Gangtok, Sikkim. pp 199-206.
- Singh Shweta, Chhetri Kala, Raj Chandramani and Gopi R. 2019. Quality Spawn Production of Mushroom in Training Manual on Quality Organic Seed Production in Agricultural & Horticultural Crops (Ed) Avasthe R.K., Kapoor Chandan, Yadav Ashish, Singh Raghavendra and Singh Matber. . ICAR-NOFRI, Tadong- 737102, Gangtok, Sikkim. pp 129-143



Folders:

- Organic Oyster mushroom cultivation technology (Reprint) - R. Gopi, Shweta Singh, Chandramani Raj, Ashish Yadav, R.K. Avasthe, N. J. Singh, H. Kalita and Matber Singh

Meerut

Research Paper :

- Singh, S., Singh, G. (2018). Effect of Different pH, temperature and media on radial growth of Oyster Mushroom (*P. djamor*), *Bull. Env. Pharmacology and Life Sci.* Vol. 7(11):73-77.
- Kumar, S., Singh, G., Kannaujia, J.P., Soam, A., Kumar, A. and Verma, R.P. (2018). Effect of different substrates on (sporophore) yield of oyster mushroom (*P. florida*), *J. of Pharm. and Phyto.*, 8 (1): 655-657.
- Soam, A., Singh, G., mohit, Ahmad, S., Kumar, S. and Katiyar, Sonu (2018). Studies on effect of different organic additives wet weight basis cereal flour on fungal disease incidence and yield of oyster mushroom, *J. of Pharm. and Phyto.*, 7(4): 3222-3224.
- Mohit, Singh, G., Singh, R., Mishra, P., Singh, DV and Kumar, Arvind (2018). Effect of sugarcane leaves as substrate on production milky mushroom (CI-16-02 and CI-16-03) *J. of Pharm. and Phyto.*, 7(5):523-526.
- Katiyar, S., Singh, G., Mohit, Kumar, S. and Soam, A. (2018). Effect of different sugars on spawn growth (mm) of milky mushroom (*C. indica*) *J. of Pharm. and Phyto.*, 7(5): 595-597.
- Mishra, A.K., Singh, G., Kumar, A., Yadav, A.K. and Mohit (2018). Comparative studies of spawn growth on different grains substrate in three *Pleurotus* spp. (*P. florida*, *P. flabellatus* and *P. sapidus*), *Int. J. Curr. Microbiol. App. Sci.*, 7(6): 3239-2345.

- Kumar, S., Singh, G., Mohit and Kannaujia, J.P. (2019). *In-vitro* evaluation of mycelia growth of *P. sapidus* against different botanicals, *J. of Pharm. and Phyto.*, 8(1): 655-657.

Paper presented in seminars/symposia :

- Singh, G., Singh, R., Kumar, S. and Kannaujia, J. P. (2019). Beneficial use of inorganic and organic chemicals in Oyster mushroom production: An overview. Paper presented in National Workshop on ICIESSD in SVPUA&T, Meerut from 20-21.04.2019.

Thesis Guided :

- Mohit. Ph.D. student guided for Studies on production technology on Milky Mushroom
- Amarpal Som. M. Sc. Student guided for Studies on Disease management of oyster mushroom.
- Sonu Katiyar. M. Sc. Student guided for Studies on spawn quality on Milky Mushroom.
- Surandra Kumar M. Sc. Student guided for Studies on production technology of oyster mushroom.

Academic activities :

- Taught two courses on Mushroom Production Technology, Plant Pathology, Pl. Path-517 (2-0-1) and Experiential Learning on Mushroom, AEL-312 (10-0-10)

New paper articles:

- Krishi Vishvavidya m Mushroom Divash manaya. Hindustan, 24.12.18. pp. 18.
- Mushroom ki kheti se badhegi Kisano ki aay. Dainik Jagran, 30.03.19. pp. 4.
- Mushroom utpadan se Badh sakti hai kisano ki aay. Amar Ujala, 30.03.19. pp. 5.



Sl.No	AICRP Centre	Name of staff	Designation	Email and Phone
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5.	Mushroom Research and Training Centre, G.B. Pant University of Agri. & Tech., Pantnagar – 263 145 (Uttarakhand)	Dr SK Mishra Smt. Ranu Singh Mr. Sarvesh Kumar Mr. Dev Kumar	PI & Senior Research Officer Technical Asstt. FieldAsst. (Retd) Beldar	pi.aicrpmushroom @gmail.com 9410405616
6.	Dept of Plant Pathology, CoHF, CAU, Pasighat – 791 102 (Arunachal Pradesh)	Dr. RC Shakywar	Assistant Professor	rcshakywar@gmail.com 9402477033
7.	AICRP on Mushroom, College of Agriculture, MPKV, Pune-411 005 (MS)	Dr. A.P. Gaikwad Dr. AC Jadhav Mrs. M.C. Dhavale Shri. N. G. Desai Shri. S.C. Pawar	Mycologist Jr. Mycologist Jr. Res. Asstt./ Technical Asstt. Agril. Asstt./Field man LDC typist	mushroompune @rediffmail.com 9850459448
8.	Mushroom Research Laboratory, Dept. of Plant Pathology, IGKV, Raipur – 492 006 (Chhattisgarh)	Dr. C. S. Shukla Dr. Harvinder Singh Shri B. L. Sinha Smt. Surji Bai Yadav	Mycologist Asst. Mycologist Field Ext Officer Peon (Beldar)	cshukla60@gmail.com 9893950649
9.	Department of Microbiology, Faculty of Basic Sciences and Humanities, RPCAU, Pusa (Samastipur) - 848 125 (Bihar)	Dr. Dayaram	Professor	raudayaram@gmail.com 9430464088
10.	Dept. of Plant Pathology, Rajasthan Collage of Agriculture, Maharana Pratap University of Agric. & Tech., Udaipur – 313 001 (Rajasthan)	Dr. S. S. Sharma Mrs. Kala Nath Mr. A Kumar Nagda Mr. Nathu Singh Mr. Kishan Singh Rajput	Professor Field Supervisor Lab Assistant Clerk Grade-II (Retired on 28.02.2019) Beldar	sharmass112@gmail.com 7073105583
11.	Department of Plant Pathology CoA, Vellayani – 695 522 Thiruvananthapuram, (Kerala)	Dr. Heera G. Dr. Deepa Rani	Asst. Professor Farm Officer	susha.thara@kau.in 9387813940
12.	CSK HPKV, Palampur(HP)			
C. State Govt based Coordinating Centres				
1.	Haryana Agro Industrial Corperation R & D Centre, Murthal, Sonapat (Haryana)	Dr. Ajay Yadav	Scientist	Drajaysingh2@gmail.com 9467825549

Sl.No	AICRP Centre	Name of staff	Designation	Email and Phone
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 Dr. Savita Jandaik	Pr. Scientist Scientist	dkguhf@rediffmail.com 9418030489
2.	ICAR-VPKAS Almora, 263 601, Uttarakhand	Dr. KK Mishra	Pr. Scientist	mishrakkpatho@gmail.com 9997887519
3.	Division of Plant Pathology, Faculty of Agriculture, SKUAST-J, Main Campus Chatha, Jammu (J&K)-180 005	Dr Sachin Gupta	Assoc. Prof.	sachinmoni@gmail.com 9419160299
4.	Mushroom Research and Training Centre, Division of Plant Pathology, SKUAST-Kashmir, Shalimar, PIN 191121, Kashmir	Dr Shaheen Kauser	Sr. Scientist	kaisershaheen@yahoo.com 9419035238
5.	Dept of Plant Pathology, Assam Agricultural University, Jorhat-785013, District Jorhat, Assam	Dr. Dilip Kumar Sarmah	Principal Scientist	Sarmah.dilip@gmail.com 9954444547
6.	Dept. of plant Pathology, SVBPU&T, Meerut (UP)- 250110	Dr Gopal Singh	Professor	singh_gopal2009@rediffmail.com 9412465255
7.	Dept. of Plant Pathology, Faculty of Agriculture, Bidhan Chandra Krishi Vishvavidyalaya, Mohanpur (WB)- 741 252	Dr (Ms) Rishu Sharma	Assist. Prof.	rrishu.sharma90@gmail.com 9419295531, 8697282866
8.	Deptt. Of Plant Pathology, SD Agricultural University Sardar, Krushinagar – 385506 (Gujrat)	Dr. K.K. Patel	Associate Prof.	Drkkpatel59@gmail.com 9998815195
9.	Dept. of Plant Pathology, SV Agriculture College, Tirupati- 517 502	Mr. Gurivi Reddy	Assist. Prof.	gurivipath@gmail.com 7036369901



9. BUDGET / RELEASED 2018-19

Centre	Recuriing Contingency (Rs. Lakh)				NEH		TSP		SC Sub Plan		Non-Recurring Contingency (Rs. Lakh)		Total (Rs. Lakh)
	Estt. Charges		Contingency including TA								Equipments and Works		
	a	b	a	b	a	b	a	b	a	b	a	b	
PAU, Ludhiana	40	40	2.7	2.7	—	—	—	—	1	1	—	—	43.7
TNAU, Coimbatore	32	32	2.55	2.55	—	—	—	—	1	1	—	—	35.55
MPKV, Pune	34.85	34.85	2.35	2.35	—	—	—	—	1	1	2	2	40.2
GBPUA&T, Pantnagar	27.65	27.65	1.85	1.85	—	—	—	—	1	1	—	—	30.5
IGKVV, Raipur	35	35	1.6	1.6	—	—	1.48	1.48	1	1	—	—	39.08
MPUAT, Udaipur	35.35	35.35	1.85	1.85	—	—	—	—	1	1	—	—	38.2
KAU, Kerala	19	19	1.85	1.85	—	—	—	—	1	1	—	—	21.85
HAU, Hisar	10	10	1.95	1.95	—	—	—	—	—	—	—	—	11.95
OUAT, Bhubneshwar	7.15	7.15	1.5	1.5	—	—	1	1	1	1	1	1	11.65
RAU, Samastipur	3	3	1.85	1.85	—	—	4	4	1	1	2	2	11.85
CAU Pasighat	—	—	—	—	3	3	—	—	—	—	—	—	3
HAIC, Murthal	—	—	2.35	2.35	—	—	—	—	2	2	—	—	4.35
HPKV, Palampur	—	—	2.5	2.5	—	—	—	—	1	1	—	—	3.5
ICARRC ER, Ranchi	—	—	0.25	0.25	—	—	—	—	—	—	—	—	0.25
ICAR RC NEH Region	—	—	0.35	0.35	4	4	—	—	—	—	—	—	4.35
ICAR RC, Sikkim	—	—	0.35	0.35	3	3	—	—	—	—	—	—	3.35
ICAR RC, Basar	—	—	0.35	0.35	3	3	—	—	—	—	—	—	3.35
ICAR RC, Nagaland	—	—	0.2	0.2	3	3	—	—	—	—	—	—	3.2
ICAR RC, Mizoram	—	—	0.85	0.85	3	3	—	—	—	—	—	—	3.85
ICAR RC, Tripura	—	—	0.35	0.35	3	3	—	—	—	—	—	—	3.35
ICAR RC, Manipur	—	—	0.5	0.5	3	3	—	—	—	—	—	—	3.5
ICAR-CARI, Port Blair	—	—	1.85	1.85	—	—	—	—	1	1	—	—	2.85
IIHR, Bangalore	—	—	2.75	2.75	—	—	—	—	—	—	—	—	2.75
UHF, Nauni	—	—	1.7	1.7	—	—	—	—	1	1	—	—	2.7
VPKAS, Almora	—	—	1.85	1.85	—	—	—	—	—	—	—	—	1.85
SKUAST, Kashmir	—	—	1.85	1.85	—	—	—	—	1	1	—	—	2.85
SKUAST, Jammu	—	—	1.8	1.8	—	—	—	—	1	1	—	—	2.8
AU Assam	—	—	1.85	1.85	—	—	—	—	—	—	—	—	1.85
SVBP, Meerut	—	—	1.85	1.85	—	—	—	—	2	2	—	—	3.85
BCKVV, Kalyani	—	—	1.85	1.85	—	—	—	—	1	1	—	—	2.85
DAU, Gujrat	—	—	—	—	—	—	—	—	—	—	—	—	0
ANGRAU Hyderabad	—	—	—	—	—	—	—	—	—	—	—	—	0
Total	244	244	45.45	45.45	25	25	6.48	6.48	20	20	5	5	345.93