



22<sup>nd</sup>–25<sup>th</sup> June, 2019

# ALL INDIA CO-ORDINATED RESEARCH PROJECT on Vegetable Crops proceedings OF XXXVII GROUP MEETING

held at  
**TNAU, Coimbatore, Tamil Nadu**

भा.कृ.अनु.प.-भारतीय सब्जी अनुसंधान संस्थान  
वाराणसी-221 305

**ICAR-Indian Institute of Vegetable Research**  
Varanasi-221 305



# **ALL INDIA CO-ORDINATED RESEARCH PROJECT on Vegetable Crops**

## **proceedings**

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**ICAR-INDIAN INSTITUTE OF VEGETABLE RESEARCH**  
**VARANASI – 221 305**

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**ALL INDIA COORDINATED RESEARCH PROJECT ON VEGETABLE CROPS  
XXXVII GROUP MEETING OF VEGETABLE RESEARCH WORKERS TO BE HELD AT  
COIMBATORE, FROM 22-25<sup>th</sup> JUNE, 2019**

**AGENDA**

Date	Time (Hr.)		
22.06.2019	09:00-10:00	REGISTRATION	
<b>TECHNICAL SESSIONS</b>			
<b>(Review of work done, recommendation and finalization of Technical Programme)</b>			
	<b>10:00-11:30</b>	<b>Inauguration</b>	
		ICAR Song	
		Welcome	Dr. L. Pugalendhi, Dean, TNAU, Coimbatore
		Director Remarks & Project Coordinator Report	Dr. Jagdish Singh, Director, ICAR- IIVR
		Remarks& Key Note Address	Dr. Janakiram, ADG (HS), ICAR
		Presidential Address	Director Research, TNAU, Coimbatore
		Inaugural Address	Chief Guest
		Vote of Thanks	Dr. L. Pugalendhi, Dean, HC&RI, TNAU, Coimbatore
	<b>11:30-12:00</b>	<b>HIGH TEA</b>	
	<b>12:00-13:00</b>	<b>Session-I : Performance Evaluation</b>	
		Chairperson	Dr. T. Janakiram, ADG (HS), ICAR, New Delhi
		Co-Chairman	Dr. Jagdish Singh, Director, ICAR- IIVR, Varanasi
		Convener	Dr. S.K. Verma, Pr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. B.K. Singh, Scientist, ICAR- IIVR, Varanasi
			Dr. B. Rajasekhar Reddy, Scientist, ICAR- IIVR, Varanasi
		Action taken report	Dr. S.K. Verma, Pr. Scientist, PCCell, ICAR- IIVR, Varanasi
	<b>13:00-13:45</b>	<b>Lunch Break</b>	
	<b>13:45-15:45</b>	<b>Session-II : Collection, Evaluation, Conservation and Utilization of Germplasm</b>	
		Chairperson	Dr. S. Natarajan, Former Dean, HC&RI, TNAU, Coimbatore
		Co- Chairperson	Dr. V. Kanthaswamy, Dean, PAJANCOA, Karaikal
			Dr. Pradeepkumar T., Dean, KAU, Vellanikkara
		Convener	Dr. S.K.Tiwari, Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. D.R. Bhardwaj, Pr. Scientist, ICAR-IIVR, Varanasi
			Dr. K.K. Gautam, Scientist, ICAR-IIVR, Varanasi
	<b>15:45-16:00</b>	<b>Tea Break</b>	
	<b>16:00-18:00</b>	<b>Session-III : Varietal Evaluation</b>	
		Chairperson	Dr. B. Singh, Director General, UPCAR,

			Lucknow
		Co- Chairperson	Dr. B. Geetha, Director, CPBG, TNAU, Coimbatore
		Convener	Dr. Sudhakar Pandey, Pr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. T.K. Behra, Pr. Scientist, ICAR-IARI, New Delhi
			Dr. PradeepKarmakar, Scientist, ICAR-IIVR, Varanasi
<b>23.06.2019</b>	<b>9:30-11:30</b>	<b>Session-IV : Hybrid Evaluation</b>	
		Chairperson	Dr. K. E. Lawande, Ex. Vice Chancellor, BSKVV, Dapoli
		Co- Chairperson	Dr. L. Pugalendhi, Dean, HC&RI, TNAU, Coimbatore
		Convener	Dr. N. Rai, Pr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. H. Choudhary, Pr. Scientist, ICAR-IARI, New Delhi
			Dr. B. K. Singh, Scientist, ICAR-IIVR, Varanasi
	<b>9:30-11:30</b>	<b>Session-VI : Vegetable Production</b>	
		Chairperson	Dr. Kirti Singh, Ex. Chairman, ASRB, New Delhi
		Co- Chairperson	Dr. V.S. Yadav, Director, RARI, Durgapura
		Convener	Dr. R.N. Prasad, Pr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. S.K. Singh, Pr. Scientist, ICAR- IIVR, Varanasi
			Dr. AnantBahadur, Pr. Scientist, ICAR-IIVR, Varanasi
	<b>11:30-11:45</b>	<b>Tea Break</b>	
	<b>11:45-13:00</b>	<b>Session-V: Evaluation for Biotic and Abiotic Stresses (Concurrent)</b>	
		Chairperson	Dr. K.V. Peter, Ex. Vice Chancellor, KAU, Vellanikkara
		Co- Chairperson	Dr. A.S. Dhatt, Head, PAU, Ludhiana
		Convener	Dr. R.K. Dubey, Sr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. Arup Chattopadhyaya, Professor, BCKV, Kalyani
			Dr. Indivar Prasad, Scientist, ICAR- IIVR, Varanasi
	<b>11:45-13:00</b>	<b>Session-VIII : Physiology, Biochemistry and Processing (Concurrent)</b>	
		Chairperson	Dr. D.P. Ray, Ex. Vice Chancellor, OUAT, Bhubaneswar
		Co- Chairperson	Dr. P. Jeyakumar, Prof. & Head, TNAU, Coimbatore
		Convener	Dr. Sudhir Singh, Pr. Scientist, ICAR- IIVR,

			Varanasi
		Rapporteur	Dr. Neena Chawala, Professor, PAU, Ludhiana
	<b>13:00-13:45</b>	<b>Lunch Break</b>	
	<b>13:45-15:45</b>	<b>Session-IX : Insect Pest Management (Concurrent)</b>	
		Chairperson	Dr. J.S. Kennedy, Dean (PGS), TNAU, Coimbatore
		Co- Chairperson	Dr. A.B. Rai, Ex. Head, ICAR-IIVR, Varanasi
		Convener	Dr. Jaydeep Halder, Scientist, ICAR- IIVR, Varanasi
		Rapporteur	Dr. Prasannakumar, N.R., Scientist, ICAR- IIHR, Bengaluru
			Dr. S.A. Pawar, Jr. Entomologist, MPKV, Rahuri
	<b>13:45-15:45</b>	<b>Session-VII : Disease Management (Concurrent)</b>	
		Chairperson	Dr. A.S. Krishnamurthy, TNAU, Coimbatore
		Co- Chairperson	Dr. M.K. Reddy, Head, ICAR- IIHR, Bengaluru
			Dr. T. Raguchander, Dean (DSW), TNAU, Coimbatore
		Convener	Dr. A.N. Tripathi, Scientist, ICAR- IIVR
		Rapporteur	Dr. Abhishek Sharma, Associate Professor, PAU, Ludhiana
			Dr. K. Nagandran, Scientist, ICAR- IIVR, Varanasi
	<b>15:45-16:00</b>	<b>Tea Break</b>	
	<b>16:00-18:00</b>	<b>Session: XIII Protected Cultivation (Concurrent)</b>	
		Chairperson	Dr. B. Sreedharan, Dean, AEC&RI, TNAU, Coimbatore
		Co- Chairperson	Dr. D.K.Singh, Prof., GBPUA&T, Pantnagar
		Convener	Dr. S.N.S. Chaurasia, Pr. Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. S.S. Hebbar, Pr. Scientist, ICAR-IIHR, Bengaluru
			Dr. Hare Krishna, Pr. Scientist, ICAR-IIVR, Varanasi
<b>24.06.2019</b>	<b>9:30-11:30</b>	<b>Session-X : Seed Production</b>	
		Chairperson	Dr. S. Sundareswaran, Director, Seed Centre, TNAU, Coimbatore
		Co- Chairperson	Dr. B.S. Tomar, Head, ICAR-IARI, New Delhi
		Convener	Dr. Manimurgan C., Scientist, ICAR-IIVR, Varanasi
		Rapporteur	Dr. Rajinder Singh, Professor, PAU, Ludhiana
			Dr. H. Usha Nandhini Devi, TNAU, Coimbatore
	<b>11:30-11:45</b>	<b>Tea Break</b>	
	<b>11:45-13:00</b>	<b>Session-XI : Breeder Seed Production and Price Fixation</b>	
		Chairperson	Dr. B.S. Tomar, Head, ICAR-IARI, New Delhi



		Co- Chairperson	Dr. P. Selvaraju, Former Director (Seeds), TNAU, Coimbatore
			Dr. Renukadevi, Professor, TNAU, Coimbatore
		Convener	Dr. Manimurgan C., Scientist, ICAR- IIVR, Varanasi
		Rapporteur	Dr. R.K. Yadav, Pr. Scientist, ICAR-IARI, New Delhi
			Dr. Sandeep Kumar, Scientist, ICAR-IARI (RS), Katrain
	<b>13:00-13:45</b>	<b>Lunch Break</b>	
	<b>13:45-15:00</b>	<b>Session-XII : Public Private Interface (Discussions with Private Sector)</b>	
		Chairperson	Dr. Krishna Prashad, Tierra Seed Pvt. Ltd.
		Co- Chairperson	Dr. A.S. Dhatt, Head, PAU, Ludhiana
		Convener	Dr. T.S. Aghora, Pr. Scientist, ICAR- IIHR, Bengaluru
		Rapporteur	Dr. M. Pitchaimuthu, Pr. Scientist, ICAR-IIHR, Bengaluru
			Dr. PradipKarmakar, Scientist, ICAR-IIVR, Varanasi
	<b>15:45-16:00</b>	<b>Tea Break</b>	
	<b>16:00-18:00</b>	<b>Discussion : Technical Programme</b>	
<b>25.06.2019</b>	<b>10:00-13:00</b>	<b>Plenary Session</b>	
		Chairperson	Dr. N. Kumar, Vice Chancellor, TNAU, Coimbatore
		Co- Chairperson	Dr. D.P. Ray, Former Vice Chancellor, OUAT, Bhubaneswar
			Dr. K.V. Peter, Former Vice Chancellor, KAU, Vellanikkara
			Dr. Jagdish Singh, Director, ICAR- IIVR, Varanasi
		Rapporteur	Dr. S.K. Verma, Pr. Scientist, ICAR- IIVR, Varanasi
			Dr. B. R. Reddy, Scientist, ICAR- IIVR, Varanasi
		Presentation of reports of Technical Sessions	
		Finalization of Technical Programme	
		Vote of thanks	
	<b>13:00-13:45</b>	<b>Lunch Break</b>	
	<b>13:45-16:00</b>	<b>Visit to Coimbatore experimental farm</b>	

## SESSION-I

### Performance Evaluation

Chairperson	:	Dr. T. Janakiram, ADG (HS), ICAR, New Delhi
Co-Chairman	:	Dr. Jagdish Singh, Director (Act.), ICAR-IIVR, Varanasi
Rapporteur	:	Dr. B.K. Singh, Sr. Scientist, ICAR-IIVR, Varanasi
	:	Dr. B. Rajasekhar Reddy, Scientist, ICAR-IIVR, Varanasi
Action taken report	:	Dr. S.K. Verma, PS, PC Cell, AICRP (VC), ICAR-IIVR, Varanasi

At the outset, Chairperson Dr. T. Janakiram, ADG (HS), ICAR, New Delhi welcomed the delegates and participants. He stressed on importance of vertical farming and formulation of network programmes. He also suggested that instead of generalized advisory, there should be action oriented remarks to all the centres. CMS/CGMS/GMS lines should be shared following the licensing norms to facilitate breeders right & faster hybrid development. Thereafter, the Chairperson invited Dr. S.K. Verma, Pr. Scientist, PC Cell, AICRP (Vegetable Crops) to present the action taken report on the recommendations made during XXXVI workshop.

The following suggestions emerged during the deliberations:

- Quantified data and concrete findings / progress should be reflected and presented in action taken report for every recommendation (**Action: PC Cell**).
- Advance planning should be made for submitting entries for varietal/hybrid/resistant trials to AICRP (VC) (**Action: PC Cell & All concerned centres**).
- Document should be prepared with trait specific germplasm available with different centres (**Action: PC Cell & All concerned centres**).
- Network programme for special problems like ToLCV in tomato; ChiLCV in chilli; YVMV in okra; powdery mildew in pea etc. should be submitted to National Science Fund by partnering stake holders from private sectors (**Action: PC Cell & Major centres**).
- Residue analysis required for AICRP (VC) trials should be taken by National Referral/ accredited Laboratories. Provision for additional budget for this analysis may be arranged by PC Cell under contingency.
- Achievements for five decades are to be prepared and presented in next AICRP (VC) group meeting.

### Recommendations:

- Every breeder/centre should get IC number from NBPGR, New Delhi for developed/collected germplasm and the details should be submitted to the PC Cell timely. (**Action: All concerned centres**)
- Varietal or hybrids trial of brinjal should not be allotted to centres where bacterial wilt is a problem (**Action: PC Cell**).

A committee was constituted by the Chairman to deliberate upon the decoding of entries every year and come out with suitable recommendation.

1.	Dr. K. E. Lawande, Former Vice Chancellor, BSKKV, Dapoli	Chairman
2.	Dr. A.S. Dhatt Head, Div. of Veg. Crops, PAU, Ludhiana	Member
3.	Dr. B.S. Tomar, Head, Div. of Veg. Sci., ICAR-IARI, New Delhi	Member
4.	Dr. T.S. Aghora, Principal Scientist, ICAR-IIHR, Bengaluru	Member
5.	Dr. Krishna Prasad, Tierra Seed Science Pvt. Ltd.	Member
6.	Dr. L. Pugalendhi, Dean, HC&RI, TNAU, Coimbatore	Member
7.	Dr. Jagdish Singh, Director, ICAR-IIVR, Varanasi	Member Secretary

The session ended with a vote of thanks to the chair.

## SESSION-II

### Collection, Evaluation, Conservation and Utilization of Germplasm

Chairperson	: Dr. S. Natarajan, Former Dean, HC& RI, TNAU, Coimbatore
Co-Chairperson	: Dr. V. Kanthaswamy, Dean, PAJANCOA, Karaikal Dr. Pradeepkumar T., Dean, KAU, Vellanikkara
Convener	: Dr. S.K. Tiwari, ICAR-IIVR, Varanasi
Rapporteurs	: Dr. D.R. Bhardwaj, ICAR-IIVR, Varanasi Dr. K.K. Gautam, ICAR-IIVR, Varanasi

At the outset, Dr. S. Natarajan, Former Dean, HC& RI, TNAU, Coimbatore, (Tamil Nadu) Chairperson of the technical session, welcomed the delegates and highlighted the use of genetic resources for strengthening the breeding programme in vegetable crops. He also informed that India possesses rich diversity in agri-horticultural crops particularly vegetables in different agro-ecological niches. There are many more vegetables (underutilized/unexploited), where attention has not been paid, should be given priority for exploration, collection, evaluation, conservation and use.

The Chairperson invited Dr. D.R. Bhardwaj, Principal Scientist, ICAR-IIVR, Varanasi to present the PGR activities being carried out at different institutes of AICRP (VC). Dr. Bhardwaj presented the findings of germplasm evaluation submitted by different centers during 2017-18 and 2018-19. During the year 2018-19, a total of 111 trials were allotted among 33 centres. Out of these trials, 48 were conducted and 63 trials were still in progress. He highlighted the promising germplasm for specific traits of various crops evaluated at different centres.

Dr. K.K. Gangopadhyay, Principal Scientist, ICAR-NBPGR, New Delhi presented the report pertaining to augmentation, characterization and evaluation of germplasm at ICAR-NBPGR, New Delhi and its regional stations. During the year, a total of 1142 accessions of different vegetable crops were collected from 28 explorations undertaken within the country. A total of 60 accessions of brinjal wild species (*Solanum incanum*) were characterized and evaluated for shoot and fruit borer resistance in field conditions during kharif 2017-18 at New Delhi and 30 accessions were evaluated at NBPGR, RS, Hyderabad (Telangana). A total of 69 accessions of wild species (*Abelmoschus moschatus*) were characterized and evaluated for okra yellow vein mosaic virus and enation leaf curl virus in field conditions during kharif 2017-18 at New Delhi. A total of 2,624 germplasm accessions were processed for long term conservation. During 2018-19, a total of 61 accessions out of 714, were intercepted for insects, pests and diseases. A total of 2883 accessions of seed and planting material of different vegetable crops were supplied to ICAR institutes/SAUs/coordinated schemes.

Dr. S.K. Yadav, Principal Scientist, ICAR-NBPGR, New Delhi briefed the house about the existing procedures and policies of germplasm exchange in vegetable crops. He briefed the Material Transfer Agreement (MTA) form and Gex-01 form as mandatory requirement for sharing of germplasm within the country, process of getting import permit from NBPGR and importance of phytosanitary certificate for import of PGR. He emphasised on getting Indigenous collection (IC) numbers for all PGR holdings of the ICAR institutes/ SAUs. As per NBPGR mandate, the feedback information and multiplied seeds of the supplied germplasm was brought to the knowledge of concerned recipients.

Dr. Jagdish Singh, Director (Acting), ICAR-IIVR and Project Coordinator, AICRP (VC) emphasized on streamlining of PGR management activities. He formulated a committee of the following members to finalize the technical program of “Collection, Evaluation, Conservation and Utilization of Germplasm of Vegetable Crops” for vegetable crops for the year 2019-20:

Dr. D. R. Bhardwaj, IIVR	Dr. S. K. Tiwari, IIVR
Dr. K. K. Gangopadhyay, NBPGR	Mr. K.K. Gautam, IIVR
Dr. T.H. Singh, IIHR	Dr. Aastik Jha, SASRD, N.U.
Dr. S. K. Yadav, NBPGR	

#### **General suggestions to streamline the germplasm activities in vegetable crops:**

1. In germplasm exploration programme, priority should be given to underutilized/unexploited vegetable crops.
2. Stable advance lines should be submitted to ICAR-NBPGR, New Delhi for conservation and utilization and the material generated through pre-breeding in vegetable crops should be reported to Project coordinator (VC).
3. Trait specific evaluation (nutritional, quality, resistance to biotic/ abiotic stresses etc.) should be reported. To this effect, a network program should be initiated for evaluation of germplasm with special focus on national problems in vegetable crops

#### **Recommendations and action points from the session**

1. **Reports from centres on germplasm characterization and evaluation shall be included in the Annual Report of AICRP (VC) only for those accessions/genotypes having IC numbers.** Accordingly all centers must take necessary initiatives for obtaining IC number from NBPGR, New Delhi.
2. PC cell may designate crop-wise nodal centres for management of vegetable genetic resources. These centres would take lead in coordinating the characterization and evaluation of the germplasm.
3. All the centres should evaluate the germplasm along with at least one national and / or one local check for minimum two years as per minimal descriptor lists (already provided to the centres).

*Annexure-I*

**List of promising germplasm available with different centers (2017-18)**

<b>Crops</b>	<b>Centre (Accessions)</b>	<b>Notable/Promising germplasm</b>
<b>Amaranth</b>	Vellanikkara (26)	Yield (Red leaf) (g/plant): VKA 6 (10.5 kg)
<b>Ash gourd</b>	Vellanikkara (8)	Yield: VKAg-1 (9.90 kg/plant)
<b>Bitter gourd</b>	Rahuri (20)	Fruit fly tolerance: RHRBTG-2 (5.32%)
	Vellanikkara (15)	Yield: VKB-14 (3.50 kg/plant)
	IIVR (8)	Yield: VRBTG-23(1.30 kg/plant)
<b>Bottle gourd</b>	Rahuri (5)	RHRBG-1 (362.00 q/ha), club shape fruit
	IIVR (8)	DRAG-8 (high yield and long fruit), VRBG-9-1-1(high yield and earliness)
<b>Cucumber</b>	Rahuri (34)	RHRCUC-29: 50% flowering and attractive colour; RHRCUC-3: Dark Green; RHRCUC-1: Lightgreen fruited
	IIHR (10)	IIHR-438 (Light green high yield), IIHR-440 (Low PDI for downy mildew)
	Nagaland (21)	SRDC-4-16 (Light green, high yield: 2 kg/plant)
	Pantnagar (5)	PCPGR-51 (Marketable high yield: 40.10 q/ha))
<b>Pointed gourd</b>	RAU, Pusa	Yield: RPGS 5 (4.43 kg/plant)
	Sabour (20)	BRPG 12-9 (high yield: 7.08 kg/plant, greenish white),
<b>Ridge gourd</b>	IIVR (13)	Yield (q/ha): VRRG – 18-17 (98.34)
	Rahuri (5)	RHRRG-2: earliness (48.2 days), RHRRG-6: fruit number per plant (17.60)
<b>Ivy gourd</b>	IIVR (8)	Yield: VRIG-4 (8.35 kg/plant)
	Vellanikara (10)	High Yield: CG-30 (11.7 kg/plant)
<b>Muskmelon</b>	IIVR (15)	High yield (3.87 kg/pl) with High TSS (10 %)
	Rahuri (47)	RHMM-5.62 (lower DM and fruit fly incidence)
<b>Pumpkin</b>	Vellanikkara (10)	VKP-1 (yellow pulp colour with high yield: 12.65 kg/pl)
	Nagaland (10)	SRDP-9-17 (High yield: 10.80 kg/pl)
<b>Cho-cho</b>	ICAR-Barapani (52)	RCSC-46 (fruit per plant-46, yield/plant-20.7kg)
<b>Watermelon</b>	Durgapura (3)	DWM-17 (High yield: 40kg/plot)
<b>Tomato</b>	RAU, Pusa (24)	Yield/ha (kg): RT-2 (562.24)
<b>Brinjal</b>	RPCAUI, Pusa (16)	RB-13 (fruit wt 145.7 g)
<b>Chilli</b>	CITH (3)	Kashmir chilli-1(Fruit length 9.26cm, fruit diameter 1.40cm, fruit weight 9.60g)
<b>Capsicum</b>	Katrain (5)	Yield (q/ha): KTC-144 (298.57)
	Solan (10)	Yield (q/ha): CW-308 (252.5)
<b>Paprika</b>	CITH (1)	Marketable yield (q/ha): Kashmir paprika-1
<b>Pea</b>	Palampur (50)	DPPMFWR-30: Fasciated type, a mutant isolated from Azad P-1 variety, moderately resistant to powdery mildew disease, medium growth habit, light green medium sized pods having 5-6 seeds/pod
<b>French bean</b>	Nagaland	NUFB-2-17: Yield/plant-140.80 g, pod weight-70g
	IIVR (13)	Yield (q/ha):VRFB-91 (139.7)

<b>Crops</b>	<b>Centre (Accessions)</b>	<b>Notable/Promising germplasm</b>
<b>Okra</b>	Rahuri (205)	YVMD: RHROK-01 (10.20%)
<b>Cowpea</b>	IIVR (15)	High Yield(g/pl): VRCP 167-2 (417.4)
<b>Teasle gourd</b>	Barapani (49)	High Yield(g/pl): RCTGC-18 (2257.5)
<b>Drumstick</b>	Vellanikara (14)	High Yield(kg/pl): VKMo 26 (3), High potassium (VKMo 21), High calcium (VKMo 26)
<b>Leafy vegetables (other than amaranth)</b>	Nagaland (22)	High Leaf weight (10 leaves): NUGM-3 (545.20)

**List of promising germplasm available with different centres (2018-19)**

<b>Crops</b>	<b>Centre (Accessions)</b>	<b>Notable/Promising germplasm</b>
<b>Amaranth</b>	Hyderabad (9)	Yield /plant (kg) and reddish green leaf: ST-4 (0.67) Yield /plant (kg) and green leaf: ST-5 (0.61)
	Coimbatore (94)	Yield (q/ha) and red leaf: A193 (205.0), Height (cm): A-193 (176.8)
<b>Cucumber</b>	Dapoli (17)	Konkan Kakdi: Powdery mildew (3.98 %) and High yield (233.66 q/ha)
	Nagaland (18)	SRDC-16-4: Days to first flowering (44), SRDC-4-16: yield/plant (2.10kg)
<b>Ivy gourd</b>	IIVR (14)	Yield/plant (kg): VRIG (14.78), Earliness: VRIG-6 (12.67 days for first flower)
<b>Pointed Gourd</b>	RAU, Pusa	Avg Fruit weight: PGS 2 (147)
<b>Sponge Gourd</b>	Nagaland (10)	High yield with aroma (180.2 q/ha)
<b>Pumpkin</b>	Nagaland (14)	Green color with high yield (20 kg/pl)
<b>Chow-Chow</b>	Barapani (52)	High yield (20.70 kg/pl)
<b>Tomato</b>	Pusa RPCAU	High yield (3.72 kg/pl) with high ascorbic acid (31.92)
<b>Brinjal</b>	RPCAU-Pusa (14)	Higher fruit weight: BangalBhata (1230 g); Earliness: GBL-3 (45.87 days for 50% flowering)
	IIVR (121)	Yield/plant (kg): ARBH-7866 (4.72)
<b>Chilli</b>	IIVR (360)	Stuff type chilli, 22 wild accession
<b>Pea</b>	Pantnagar (10)	Green pod yield (q/ha): PM 107 (104.7), TSS value ( <sup>0</sup> Brix): PM 107 (12.35)
	IIVR (32)	Green pod yield (g/pl): VRPE-31(90.3), Earliness: VRPE-64 (28 days from sowing)
<b>French bean</b>	Barapani (71 p+12b)	Pole type: Green pod yield/plant (g): MZFBC-2 (250.80), Earliness (38 days for first flowering); Bush type: Green pod yield/plant (g): MNBFB-1 (67.50), Earliness (34 days for first flowering)
	Nagaland (32)	Pole type: Green pod yield/plant (g): NUFB-20-17 (232.50), Earliness NUFB-3-17(44 days for first flowering); Bush type: Green pod yield/plant (g): NUFG-5-17 (264.0)
	Rahuri (55)	High Yield :RHRFB-48 (84.99 g/pl)
<b>Okra</b>	IIVR (411)	Moderately tolerant to YVMD and OELCD :IC-325963 , EC-169359, IC-117310, IC-536676 and IC-260039; Round fruited (IC506134), Bushy habit (IC372171, IC371748, IC433660 and IC557134), Eight ridged (EC329422, EC329407, EC169484, EC169455, EC169414, IC140880 and IC111507)
<b>Carrot (Temperate)</b>	SKUA&T (K)(2)	Root length (cm): SH-C-93 (13.2) Yield (q/ha): SH-C-84 (64.20)
	Solan (5)	Root length (cm): SOL-CT-Sel-7 (27.67)



Crops	Centre (Accessions)	Notable/Promising germplasm
		Earliness: SOL-CT-Sel-7 (99.98 days to first root harvest) orange color
<b>Cauliflower (Early)</b>	IARI (10)	Curd Yield (q/ha): DC-137-10 (199.3)
	RPCAU Pusa (14)	High curd weight (g): RECF-11 (610); Earliness RECF-14 (41 days to 50% flowering)
<b>Cauliflower (Mid)</b>	RAU, Pusa (6)	Curd Yield (g): RMCF-4 (350) High harvest index :RMCF-2 (38.92)
<b>Cauliflower (Late)</b>	Solan (5)	Curd Yield (q/ha): White Heart (220.6) also having less incidence of curd rot
<b>Cabbage</b>	Solan (5)	Head weight (q/ha) and High yield:UHFCAB-8 (305.91)
<b>Cowpea</b>	Rau, Pusa (33)	Yield (g/pl): Nikita (308), Earliness (52.88 days after first picking)
<b>Spine gourd and sweet gourd (<i>Momordica dioica</i>)</b>	Barapani (49)	Yield/plant (kg):RTCG-18 (2.25)
	Kalyani (20)	High yield (kg/pl): BCTG-1 (4.50)
<b>Drumstick</b>	Periyakulam (64)	High yield (kg/tree): PKM MO-63 (9.8): PKM Mo-13 (High Vit-C with high crude fibre)

**Annexure II**

**Table 1: Technical program for germplasm multiplication and characterization (2019-20)**

S. No.	Crops	No. of Centers	Name of allotted centers
1.	Amaranth	4	Coimbatore*, Hyderabad, IIVR, Vellanikkara
2.	Ash gourd	2	Nagaland, Vellanikkara*
3.	Bitter gourd	3	IIVR, Rahuri, Vellanikkara
4.	Bottle gourd	3	IIHR, IIVR*, Rahuri
5.	Cucumber	6	Dapoli, IIHR, IIVR, Nagaland, Pantnagar, Rahuri
6.	Pointed gourd	3	IIVR*, RPCAU Pusa, BAU Sabour
7.	Ridge Gourd	3	IIHR*, IIVR, Rahuri
8.	Sponge gourd	2	IIVR*, Nagaland
9.	Ivy gourd	3	IIVR, IGKV- Raipur*, Vellanikkara
10.	Muskmelon	4	IIHR, IIVR, Ludhiana*, Rahuri,
11.	Pumpkin	4	IIHR, IIVR*, Nagaland, Vellanikkara,
12.	Watermelon	2	Durgapura, IIHR*
13.	Chow-chow	1	ICAR Res. Complex Barapani*
14.	Tomato	6	IIHR*, IIVR, Ludhiana, CIARI- Portblair, RPCAU- Pusa, VPKAS
15.	Brinjal	6	IIHR, IIVR*, NBPGR, CIARI- Portblair, Raipur, RPCAU Pusa,
16.	Chillies	6	IIHR*, IIVR, Lam, CAU (Pasighat), CIARI- Portblair SKUAST (K),
17.	Capsicum	5	IIHR, Katrain*, Solan, SKUAST (K), CITH
18.	Paprika	3	IIHR, CITH*, Bagalkot-Dharwad
19.	Pea	4	IIVR*, Ludhiana, Pantnagar, VPKAS
20.	French bean	6	ICAR Res. Complex Barapani, IIHR*, IIVR, Nagaland, Rahuri, VPKAS
21.	Lablab bean	3	IIVR*, Raipur, ICAR-Tripura
22.	Okra	5	IIHR, IIVR*, NBPGR, Navsari, Rahuri
23.	Carrot Temperate	3	Katrain, SKUAS&T (K), Solan*
24.	Cauliflower		
	i. Early season	2	IIVR*, RPCAU Pusa
	ii. Mid season	2	RPCAU Pusa, Sabour
	iii. Late season	2	Katrain*, Solan
25.	Cabbage	2	Katrain*, Solan
26.	Cowpea	4	IIHR*, IIVR, Raipur, RPCAU Pusa
27.	Spine gourd and sweet gourd	5	ICAR RC- Barapani, Bhubaneswar*-OUAT, Kalyani, CIARI- Portblair, Tripura
28.	Drumstick	3	IIHR, Periyakulam, Vellanikkara*

S. No.	Crops	No. of Centers	Name of allotted centers
29.	Leafy vegetables except amaranth	5	ICAR Res. Complex Barapani*, CHES- Bhubaneswar, Nagaland, CIARI- Portblair, CITH
	Total	112	

**\*Proposed Nodal Centre** - Responsible for management of vegetable genetic resources of respective crops across all centres. These nodal centres would take lead in coordinating the characterization / evaluation and reporting of crop specific germplasm to PC Cell.

*Annexure III*

**Table: Vegetable crops specific National Exploration Plan proposed in: 2019-2020**

Sr. No	Species/crops	Area: State and districts	Period	Leader & Associate	Collaborator
<b>HQ: ICAR- NBPGR, N. Delhi</b>					
1	Cucurbits (culti. & wild except <i>Trichosanthes</i> ) and niger	<b>Madhya Pradesh:</b> Singrauli, Sidhi, Jaisinghnagar districts	Dec. (end) 2019	Anjula Pandey & S. Nivedhita, ICAR- NBPGR, N. Delhi	ICAR-IIVR, Varanasi (Dr Sudhakar Pandey)
2	Round gourd	<b>Catchment area of Chambal river in Etawa (UP), Murena, Bhind, Sheopur (MP) and Dhaulpur, Karuli &amp; Sawaimadhopur (Rajast)</b>	July-August 2019	VK Sharma, GED, NBPGR, N. Delhi & Kartar Singh, NBPGR, RS, Jodhpur	ICAR-IIVR, Varanasi (Dr K K Gautam)
3	Cucurbits and leafy vegetables ( <i>Basella, amaranth</i> ), wild <i>Solanum &amp; Abelmoschus</i>	<b>Bihar:</b> Bhagalpur Munger; <b>Jhrakhand:</b> Sahibagnj districts	Oct. (end) 2019	SK Yadav, GEX, ICAR- NBPGR, N. Delhi	ICAR-IIVR, Varanasi (Dr Vidya Sagar)
<b>ICAR-NBPGR-RS, Akola</b>					
4	Cucurbits (culti. & wild); brinjal, chilli & <i>Abelmoschus</i> (wild)	<b>Maharashtra:</b> tribal areas in Yavatmal, Wardha & Chandrapur districts	Oct.- Nov., 2019	Dinesh C. Chamola, ICAR- NBPGR, RS, Akola	ICAR-IIVR, Varanasi (Dr S K Tiwari)
<b>ICAR-NBPGR-RS, Cuttack</b>					
5	Cultivated and wild relatives of cucurbits, solanum, <i>Abelmoschus</i> , other minor vegetables	<b>Odisha:</b> Tribal areas in Keonjhar and Mayurbhanj districts	Nov. , 2019	RC Mishra, ICAR- NBPGR, RS, Cuttack	ICAR-IVRI, Varanasi (Dr. P. Karmakar)
<b>ICAR-NBPGR-RS, Hyderabad</b>					
6	Landraces of chilli (yellow) and wild cajanus ( <i>Cajanus cajanifolius</i> )	<b>Andhra Pradesh:</b> East Godavari and Vishakhapatnam	Jan.- Feb., 2020	S. Pandravada, ICAR- NBPGR, RS, Hyderabad	DR YSRHU/ICAR-IIHR, Bengaluru

<b>ICAR-NBPGR-RS, Ranchi</b>					
7	Cucurbits( <i>Coccinia</i> , <i>luffa</i> , <i>momordica</i> , <i>cucumis</i> etc.), other vegetables (except <i>Solanum</i> ) and millets	<b>Bihar:</b> Tribal areas of Katihar and Purnia districts	Nov.- Dec., 2019	Reshmi Raj Kr ICAR-NBPGR, RS, Ranchi	ICAR-IIVR, Varanasi ( Dr Vikash Singh) and BAU, Ranchi
<b>ICAR-NBPGR-RS, Thrissur</b>					
8	Legumes & pulses: Pigeon pea (perennial type), <i>Dolichos</i> / field bean, lima/ butter bean, rice bean, sword bean, etc. (vege. & grain types)	<b>Tamil Nadu:</b> Erode, Salem and Dharmapuri districts	Dec., 2019	A. Suma, ICAR-NBPGR, RS, Thrissur	Deptt. of PGR, TNAU, Coimbatore / ICAR-IIHR Bengluru
9- \$	<i>Cucumis silentvalleyi</i> , <i>Trichosanthes nervifolia</i> , <i>Abelmoschus angulosus</i> var. <i>purpureus</i> , <i>Sesamum prostratum</i> , <i>Momordica sahyadrica</i> and other RET niche specific CWR	<b>\$- Kerala:</b> Palakkad and Silent Valley National Park	Nov., 2019	Josheph John, ICAR-NBPGR, RS, Thrissur	KAU, Kerala and ICAR-IIHR, Bangalore

\$- With permission of Chief Conservator of Forests (Wildlife), Forest Deptt. Govt. of Kerala,

### SESSION-III

#### Varietal Evaluation

Chairperson	: Dr. B. Singh, Director General, UPCAR, Lucknow
Co-Chairperson	: Dr. B. Geetha, Director, CPBG, TNAU, Coimbatore
Convener	: Dr. Sudhakar Pandey, ICAR-IIVR, Varanasi
Rapporteurs	: Dr. T.K. Behera, ICAR-IARI, New Delhi Dr. P. Karmakar, ICAR-IIVR, Varanasi

Chairperson Dr. Singh welcomed the delegates and in his introductory remark emphasized the importance of improved vegetable varieties for increased production of vegetable in India, and will be instrumental for sustaining and increasing the level of production and productivity in future. He also expressed his concerns about the wide variation in the data related to yield and its contributing traits in various trials. After the introductory remarks, the Chairperson invited Dr M. Pitchaimuthu, Principal Scientist, ICAR-IIHR, Bengaluru to present the progress of varietal trials pertaining to tomato, brinjal, chilli and capsicum. Dr Arup Chattopadhyay, Professor, BCKV, Kalyani presented the data on cole crops, root crops and leafy vegetables and Dr T S Aghora, Principal Scientist, ICAR-IIHR, Bengaluru on leguminous and cucurbitaceous vegetables. Progress reports of 2017-18 and 2018-19 of the respective crops were discussed comprehensively and the following suggestions and recommendations emerged.

#### Suggestions

1. Variation in the ancillary observations across the center must be taken care of; otherwise, it will question the credibility of the conductance of the trials.
2. In trial related to carrot, observation on core colour should be included in the ancillary data.
3. Centers are advised to submit the seeds and reports timely to the Project Coordinator Cell.
4. In the trial related to edible-podded pea all the entries should be of same segment and inclusion of entries of garden pea should be avoided.
5. Fruit weight variation in cherry tomato entries must be taken care of and entries with fruit weight more than 15-20g should not be included in the trial.
6. In the crops like Indian bean where number of picking is positively correlated with yield, data must include the number of picking also.
7. Some centers have reported the data of the entry, which has not been supplied to them by the PC Cell indicate the casual approach of that respective center, which must taken care by the center.
8. Centers are advised to perform proper statistical analysis of data before submitting to the PC Cell and also take care of the CD & CV value.
9. Data in various vegetable crops for fruits must be recorded at suitable edible maturity stage by the centers to make the yield data homogeneous across the centers.

#### Recommendations

1. The newly released and notified variety should be used as national checks in newly constituted IET trials.
2. The performance of AVT II trials (which are going to be concluded), should be presented along with IET & AVT-I data. The trials in IET & AVT- I should also be reviewed judiciously.

**The Chairman constituted a committee with the following member for identification of varieties and hybrids:**

1	Dr. T. Janakiram, ADG (HS), ICAR, New Delhi	Chairman
2	Dr. K. E. Lawande, Former Vice chancellor, KKV, Dapoli	Member
3	Dr. A.S. Dhatt, Head, Department of Vegetable Science, PAU Ludiana	Member
4	Dr. Arup Chattopadhyay, Professor, BCKV, Kalyani	Member
5	Dr T S Aghora, Principal Scientist, ICAR-IIHR, Bengaluru	Member
6	Dr. S K Verma, Principal Scientist, ICAR-IIVR, Varanasi	Member
7	Dr. Sudhakar Pandey, Principal Scientist, ICAR-IIVR, Varanasi	Member
8	Dr. B.R. Reddy, Scientist, ICAR-IIVR, Varanasi	Member
9	Dr. Jagdish Singh, Director, ICAR-IIVR, Varanasi	Member Secretary

The session ended with a vote of thanks.

## **TECHNICAL PROGRAMME (2019-20)**

### **A. IET Trials**

#### **1. Brinjal (Long) IET**

Sl. No.	Entry	Year	Source	Centres
1.	AB 17-08	2019	AAU, Anand	<b>I:</b> Srinagar (SKUAS&T), Pantnagar, Pithoragarh <b>III:</b> Passighat, Portblair, Barapani <b>II:</b> Kalyani, Cooch Bihar, Jorhat <b>IV:</b> Ludhiana, IIVR, Kalyanpur, Faizabad <b>V:</b> Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura <b>VII:</b> Jabalpur, Parbhani, Rahuri <b>VIII:</b> Coimbatore, IIHR
2.	DBL-08	2019	IARI, New Delhi	
3.	DBWL-22-1-11	2019	IARI, New Delhi	
4.	IVBL-28	2019	IIVR, Varanasi	
5.	JBCL-16-12	2019	JAU, Junagadh	
6.	KS-534	2019	CSAUA&T, Kalyanpur	
7.	PBL-215	2019	PAU, Ludhiana	
	Kashi Taru (C)	-	IIVR, Varanasi	
	DBL-175 (C)	-	IARI, New Delhi	

Seed Quantity	:	10 g	Total centres	:	23
Seed supply	:	30th May (23+3 pkt)	Design	:	RBD
Plot size	:	4.5 × 4.2 m	Replications	:	3
Spacing	:	75 × 60 cm			

#### **2. Brinjal (Round) IET**

Sl.No.	Entry	Year	Source	Centres
1.	AB 17-16	2019	AAU, Anand	<b>I:</b> Srinagar (SKUAS&T), Pantnagar, Pithoragarh <b>III:</b> Passighat, Portblair, Barapani <b>II:</b> Kalyani, Cooch Bihar, Jorhat <b>IV:</b> Ludhiana, IIVR, Kalyanpur, Faizabad, Ranchi <b>V:</b> Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura <b>VII:</b> Jabalpur, Parbhani, Rahuri <b>VIII:</b> Coimbatore, IIHR, UHS-Bagalkot.
2.	AB 17-28	2019	AAU, Anand	
3.	DBR-92	2019	IARI, New Delhi	
4.	DBWR-190-44-3-2-5	2019	IARI, New Delhi	
5.	IVBR-20	2019	IIVR, Varanasi	
6.	Jor Benguni	2019	AAU, Jorhat	
7.	JBCR-17-01	2019	JAU, Junagadh	
8.	KS-451	2019	CSAUA&T, Kalyanpur	
9.	RCBR-22	2019	RCER, RC, Ranchi	
10.	BBJ-19-1	2019	OUAT, Bhubaneswar	
11.	KB-02	2019	UHS, Bagalkot	
12.	KB-06	2019	UHS, Bagalkot	
	KS-235 (C)	-	CSAU&T, Kalyanpur	
	DBPR-23 (C)	-	IARI, New Delhi	

Seed quantity	:	10g	Total Centres	:	25
Seed supply	:	30 <sup>th</sup> May (25+3 pkt)	Design	:	RBD
Plot size	:	4.5 × 4.2 m	Replication	:	3
Spacing	:	75 × 60 cm			



**3. Tomato (Determinate) IET**

Sl. No.	Entry	Year	Source	Centres
1.	ATL 17-06	2019	AAU, Anand	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) <b>III:</b> Barapani, Pasighat, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Bhubaneshwar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Anand, Navsari, Durgapura <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)
2.	JTL-16-04	2019	JAU, Junagadh	
3.	JTL -16-05	2019	JAU, Junagadh	
4.	KS-233	2019	CSAUA&T, Kalyanpur	
5.	VRT-30	2019	IIVR, Varanasi	
6.	RCDT-1608	2019	RCER, RC, Ranchi	
7.	PAU MDRT-1	2019	PAU, Ludhiana	
8.	PAU MDR-2	2019	PAU, Ludhiana	
	Kashi Aman (C)	-	IIVR, Varanasi	
	Punjab Ratta (C)	-	PAU, Ludhiana	

Seed Quantity	: 10 g	Total centres	: 28
Seed supply	: 30 <sup>th</sup> May (28+3 pkt)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replications	: 3
Spacing	: 60 × 50 cm		

**4. Chilli /Hot Pepper- IET**

Sl. No.	Entry	Year	Source	Centres
1.	IIVRC-18132	2019	IIVR, Varanasi	<b>I:</b> Srinagar (SKU), Pantnagar, Srinagar (CITH), Palampur <b>II:</b> Jorhat, Kalyani, Cooch Bihar <b>IV:</b> Ludhiana, IIVR <b>V:</b> Raipur, Bhubaneshwar (OUAT), Bhubaneshwar (CHES), Lam <b>VI:</b> IARI, Hisar, Anand <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Vellanikkara, Coimbatore, Bagalkot (UHS)
2.	Khorika (CV-KH)	2019	AAU, Jorhat	
3.	PAU Sel-211	2019	PAU, Ludhiana	
4.	Helen Morok	2019	NIFG, Gandhinagar	
5.	DPC-38	2019	CSKHPKV, Palampur	
6.	BC-19-1-25	2019	Bhubaneshwar (OUAT)	
	Kashi Anmol (C)	-	IIVR, Varanasi	
	LCA-334 (C)	-	Lam, Guntur	

Seed quantity	: 20g	Total Centres	: 24
Seed supply	: 30 <sup>th</sup> May (24+3 pkt)	Design	: RBD
Plot size	: 4.2 × 3.5 m	Replication	: 3
Spacing	: 60 × 50 cm		

### 5. Cabbage (Red) IET

Sl. No.	Entry	Year	Source	Conducting centres
1.	KTCBR-3	2019	IARI (RS), Katrain	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar , Palampur <b>IV:</b> IIVR, Ludhiana, Sabour, Prayagraj (Allahabad) <b>VI:</b> IARI, Junagadh, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani
2.	KTCBR-5	2019	IARI (RS), Katrain	
3.	UHF-SOL-RCABVAR-1	2019	YSPU H&F, Solan	
4.	UHF-SOL-RCABVAR-2	2019	YSPU H&F, Solan	
	Kinner Red (C)	-	YSPU H&F, Solan	
	Local check (C)	-		

Seed quantity	: 5g	Total Centres	: 16
Seed supply	: 30 <sup>th</sup> May (16+3 pkt)	Design	: RBD
Plot size	: 4.2 x 3.5m	Replication	: 4
Spacing	: 60 x 50 cm		

### 6. Cauliflower (Early) IET

Sl. No.	Entry	Year	Source	Centres
1.	Kashi Gobhi-25	2019	IIVR, Varanasi	<b>IV:</b> IIVR, Ludhiana, Sabour, RPCAU- Pusa <b>V:</b> Hyderabad <b>VI:</b> IARI, Junagadh, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Coimbatore
2.	DC-903	2019	IARI, New Delhi	
3.	DC-71	2019	IARI, New Delhi	
4.	BRECF-10	2019	BAU, Sabour	
	Pusa Meghana (C)	-	IARI, New Delhi	
	Sabour Agrim (C)	-	BAU, Sabour	

Seed quantity	: 10 g	Total Centres	: 12
Seed supply	: 30 <sup>th</sup> June (13+3 pkt)	Design	: RBD
Plot size	: 3.00 × 2.0 m	Replication	: 4
Spacing	: 60 × 50 cm	Sowing Time	: June-July

### 7. Cauliflower (Late) IET

Sl. No.	Entry	Year	Source	Centres
1.	KTCF-30	2019	IARI (RS), Katrian	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar , Palampur <b>IV:</b> IIVR, Ludhiana, Sabour <b>V:</b> Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Coimbatore
2.	KTCF-33	2019	IARI (RS), Katrian	
3.	DPCf-1	2019	CSKHPKV, Palampur	
4.	Solan Ujjwala	2019	YSPU H&F, Solan	
5.	UHF-SOL-CAUVAR-1	2019	YSPU H&F, Solan	
6.	UHF-SOL-CAUVAR-2	2019	YSPU H&F, Solan	
	Pusa Snowball K-25 (C)	-	IARI (RS), Katrian	

Seed quantity	: 10 g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> June (18+3 pkt)	Design	: RBD
Plot size	: 3.00 × 2.0 m	Replication	: 3
Spacing	: 60 × 50 cm	Sowing Time	: Zone I: March/ April; Other Zones: July/August

**8. Broccoli Varietal- IET**

Sl. No.	Entry	Year	Source	Centres
1.	KTB-3	2019	IARI (RS), Katrain	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar, Palampur <b>IV:</b> IIVR, Ludhiana, Sabour <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Parbhani, Jabalpur, Rahuri, Chitrakoot
2.	KTB-10	2019	IARI (RS), Katrain	
3.	DC-Brocco-13 (Green Heading)	2019	IARI, New Delhi	
4.	Pusa Purple Broccoli-1	2019	IARI, New Delhi	
	Pusa Broccoli KTS-1 (C)	-	CSKHPKV, Palampur	
	Palam Samridhi (C)	-	CSKHPKV, Palampur	

Seed quantity	: 10 g	Total Centres	: 15
Seed supply	: 30 <sup>th</sup> Sept. (15+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 4
Spacing	: 45 × 30 cm		

**9. Carrot (Temperate) IET**

Sl. No.	Entry	Year	Source	Centres
1.	KTTC-50	2019	IARI, (RS) Katrain	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar <b>IV:</b> IIVR, Ludhiana, Sabour <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Rahuri, Jabalpur, Parbhani
2.	KTTC-59	2019	IARI, (RS) Katrain	
3.	UHF-SOL-CARVAR-1	2019	YSPU HF&F, Solan	
4.	UHF-SOL-CARVAR-2	2019	YSPU HF&F, Solan	
	SKAUC-50 (C)	-	SKUA&T, Srinagar	
	Pusa Yamdangini (C)	-	IARI, (RS) Katrain	

Seed quantity	: 20 g	Total Centers	: 13
Seed supply	: 30 <sup>th</sup> Sept. (13+3 pkt)	Design	: RBD
Plot size	: 2.40 × 2.50m	Replication	: 4
Spacing	: 40 × 10 cm	Sowing Time:	

### 10. Garden Pea (Early) IET

Sl. No.	Entry	Year	Source	Centres
1.	VP 1511	2019	VPKAS, Almora	<b>I:</b> Solan, Almora, Pantnagar, Pithoragarh, Ranichauri, Palampur <b>III:</b> Nagaland, Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Kalyanpur <b>VI:</b> IARI, Durgapura, Hisar <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	GP- 1101	2019	IARI, New Delhi	
3.	Arka Harini	2019	IIHR, Bengaluru	
4.	VRPE-111	2019	IIVR, Varanasi	
5.	VRPE-101-5	2019	IIVR, Varanasi	
6.	Jawahar Sel-1 (Sel-1)	2019	JNKVV, Jabalpur	
7.	KS-684	2019	CSAU A&T, Kalyanpur	
8.	PMR-85	2019	GBPU A&T, Pantnagar	
	VRP-6 (C)	-	IIVR, Varanasi	
	VP1305 (C)	-	VPKAS, Almora	

Seed Quantity	:	300 g	Total centres	:	20
Seed supply	:	30 <sup>th</sup> Sept. (20+3 pkt)	Design	:	RBD
Plot size	:	3.0 × 3.0 m,	Replications	:	3
Spacing	:	30 × 10 cm			

### 11. Garden Pea (Mid) IET

Sl. No.	Entry	Year	Source	Centres
1.	VP -1445	2019	VPKAS, Almora	<b>I:</b> Solan, Almora, Pantnagar, Pithoragarh, Ranichauri, Palampur <b>III:</b> Nagaland, Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Kalyanpur <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	VRP-500	2019	IIVR, Varanasi	
3.	VRPMS-919	2019	IIVR, Varanasi	
4.	Jawahar Sel-3 (SPS-3)	2019	JNKVV, Jabalpur	
5.	KS-680	2019	CSAU A&T, Kalyanpur	
6.	DPP-SP-3	2019	CSKHPKV, Palampur	
	Kashi Shakti VRP-7 (C)	-	IIVR, Varanasi	
	PC-531 (C)	-	PAU, Ludhiana	

Seed Quantity	:	300 g	Total centres	:	20
Seed supply	:	30 <sup>th</sup> Sept. (20+3 pkt)	Design	:	RBD
Plot size	:	3.0 × 3.0 m,	Replications	:	3
Spacing	:	30 × 10 cm			

**12. Cowpea (Bush) IET**

Sl. No.	Entry	Year	Source	Centres
1.	VRCP 68-2	2019	IIVR, Varanasi	<b>I:</b> Pantnagar, Pithoragarh <b>IV:</b> IIVR, Ludhiana, Sabour, Allahabad <b>V:</b> Bhubaneswar (OUAT), Raipur <b>VI:</b> IARI, Durgapura, Navsari <b>VII:</b> Parbhani, Jabalpur, Rahuri, Akola <b>VIII:</b> IIHR, Coimbatore, Vellanikkara
2.	VRCP 71-1	2019	IIVR, Varanasi	
3.	NCK-15-09	2019	NAU, Navsari	
4.	CP-60	2019	IARI, New Delhi	
	Kashi Kanchan (C)	-	IIVR, Varanasi	
	Kashi Nidhi (C)	-	IIVR, Varanasi	

Seed Quantity	: 150 g	Total centres	: 18
Seed supply	: 20 <sup>th</sup> May (18+3 pkt)	Design	: RBD
Plot size	: 3.6 × 3.0 m	Replications	: 4
Spacing	: 45 × 30 cm		

**13. Dolichos (Pole Type)-IET**

Sl. No.	Entry	Year	Source	Centres
1.	VRSEM-1	2019	IIVR, Varanasi	<b>IV:</b> IIVR, Ludhiana, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Lam, Raipur <b>VI:</b> IARI, Durgapura, Junagadh <b>VII:</b> Parbhani, Jabalpur, Rahuri, Akola <b>VIII:</b> IIHR, Bagalkot (UHS), Vellanikkara
2.	VRSEM-601	2019	IIVR, Varanasi	
3.	DB-24	2019	IARI, New Delhi	
4.	DB-27	2019	IARI, New Delhi	
5.	LDB-1	2019	Lam, Guntur	
6.	JK-1	2019	NIFG, Gandhinagar	
	Kashi Haritma (C)	-	IIVR, Varanasi	
	DB-10 (C)	-	IARI, New Delhi	

Seed Quantity	: 150 g	Total centres	: 16
Seed supply	: 20 <sup>th</sup> May (16+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replications	: 3
Spacing	: 150 × 75 cm		

#### 14. Sponge gourd-IET

Sl. No.	Entry	Year	Source	Centres
1.	VRSG-17-10	2019	IIVR, Varanasi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Allahabad, Banda <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Karikal, Vellanikkara
2.	VRSG-19-1	2019	IIVR, Varanasi	
3.	ASGS-19-01	2019	AAU, Anand	
4.	ASGS-19-04	2019	AAU, Anand	
5.	BUAT SG 18-1	2019	BAU, Banda	
	Kashi Shreya (C)	-	IIVR, Varanasi	
	Pusa Supriya (C)	-	IARI, New Delhi	

Seed quantity	: 100 g	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 5.5 x 2.5 m	Replication	: 3
Spacing	: 1.5 x 3 m		

#### 15. Ridge gourd- IET

Sl. No.	Entry	Year	Source	Centres
1.	JRG-13-06	2019	JAU, Junagadh	<b>IV:</b> Allahabad, IIVR, Sabour, Ranchi, Kalyanpur <b>V:</b> Hyderabad, Bhubaneswar (OUAT), Raipur <b>VI:</b> IARI, Junagadh, Bikaner (CIAH) <b>VIII:</b> IIHR, Coimbatore, Vellanikkara
2.	JRG-14-07	2019	JAU, Junagadh	
3.	VRRG-35	2019	IIVR, Varanasi	
4.	VRRG-5A	2019	IIVR, Varanasi	
5.	RCRG-111	2019	RCER, RC, Ranchi	
	Kashi Shivani (C)	-	IIVR, Varanasi	
	Manjhari (CHRG-1) (c)	-	ICAR-RCER, Ranchi	

Seed quantity	: 100 g	Total Centres	: 14
Seed supply	: 30 <sup>th</sup> Oct. (14 +3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 300 × 60 cm		

#### 16. Pumpkin IET

Sl. No.	Entry	Year	Source	Centres
1.	VRPK-222-2-1	2019	IIVR, Varanasi	<b>I:</b> Pantnagar, Pithoragarh <b>IV:</b> Ludhiana, IIVR, Kalyanpur, Faizabad <b>V:</b> Hyderabad, Raipur, Bhubaneswar (OUAT) <b>VI:</b> IARI, Durgapura, Hisar <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> Coimbatore, IIHR, Vellanikkara
2.	VRPK-63	2019	IIVR, Varanasi	
3.	PPU-25	2019	GBPUAT, Pantnagar	
4.	PPU-29	2019	GBPUAT, Pantnagar	
	NDPK-24 (C)	-	NDUAT, Ayodhya	
	HAPK-10 (C)	-	RCER, RC, Ranchi	

Seed quantity	: 100 gm	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 3.2 X 3.0 m	Replication	: 4
Spacing	: 20 X 10 cm		

**17. Watermelon IET]**

Sl. No.	Entries	Year	Source	Centres
1.	AHW/BR-40	2019	CIAH, Bikaner	<b>IV:</b> IIVR, Ludhiana <b>VI:</b> IARI, Durgapura, Bikaner (CIAH) <b>VII:</b> Jabalpur, Rahuri, Akola <b>VIII:</b> IIHR, Coimbatore, Vellanikkara
2.	AHW/BR-37	2019	CIAH, Bikaner	
3.	IIHR-86	2019	IIHR, Bangalore	
4.	VRW-514	2019	IIVR, Varanasi	
	Arka Jyoti (C)	-	IIHR, Bangalore	
	Arka Manik (C)	-	IIHR, Bangalore	

Seed quantity	: 50 g	Total Centres	: 11
Seed supply	: 30 <sup>th</sup> Oct. (11+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 150 × 75 cm		

**18. Bottle gourd IET**

Sl. No.	Entries	Year	Source	Centres
1.	PLR-1	2019	VRS-Palur, TNAU	<b>I:</b> Srinagar (SKU), Pantnagar, Pithoragarh, Jammu <b>III:</b> Pasighat, Barapani, Nagaland, Portblair <b>IV:</b> Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad <b>V:</b> Raipur, Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh <b>VII:</b> Rahuri, Jabalpur, Parbhani <b>VIII:</b> VRS-Palur, Coimbatore, Vellanikkara, IIHR, Bagalkot (UHS)
2.	PLR-2	2019	VRS-Palur, TNAU	
3.	NDBG-24	2019	NDUAT, Faizabad	
4.	VRBG-14	2019	IIVR, Varanasi	
	BBOG-3-1 (C)	-	OUAT, Bhubaneswar	
	Pusa Samridhi (C)	-	IARI, New Delhi	

Seed quantity	: 50 g	Total Centres	: 26
Seed supply	: 30 <sup>th</sup> Oct. (26+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 30 × 75 cm		

## B. AVT-I Trials

### 1. Brinjal (Long) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	DIBER BL-1	2018	DIBER, Pithoragarh	<b>I:</b> Srinagar (SKU), Srinagar (CITH), Pantnagar, Pithoragarh <b>II:</b> Kalyani, Cooch Behar <b>III:</b> Barapani, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur, Faizabad <b>V:</b> Raipur, Hyderabad <b>VI:</b> Junagadh, IARI, Anand <b>VII:</b> Jabalpur, Parbhani, Goa <b>VIII:</b> Coimbatore, Vellanikkara, IIHR
2.	BCB-42	2018	BCKV, Kalyani	
3.	KAU-FSRS-Sm-1	2018	KAU, Vellanikkara	
4.	PBL-712	2018	PAU, Ludhiana	
5.	PB-113	2018	GBPUA&T, Pantnagar	
6.	PB-114	2018	GBPUA&T, Pantnagar	
7.	DBGL-225-2-5-17	2018	IARI, New Delhi	
8.	IGBKSL-2018-3	2018	IGKV, Raipur	
9.	IVBL-26	2018	IIVR, Varanasi	
10.	Kashi Taru (C)	-	IIVR, Varanasi	
11.	Punjab Sadabhar(C)	-	PAU, Ludhiana	

Seed Quantity	: 10 g	Total centres	: 25
Seed supply	: 30th May (25+3)	Design	: RBD
Plot size	: 4.5 × 4.2 m	Replications	: 3
Spacing	: 75 × 60 cm		

### 2. Tomato (Determinate) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	BT 2017-1	2018	OUAT, Bhubaneswar	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) <b>III:</b> Barapani, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Anand, Navsari <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)
2.	ATL 17-06	2018	AAU, Anand	
3.	VRT-34	2018	IIVR, Varanasi	
4.	VRT-18-01	2018	IIVR, Varanasi	
5.	NLT-12-07	2018	NAU, Navasari	
6.	Kashi Aman(C)	-	IIVR, Varanasi	
7.	Punjab Ratta (C)	-	PAU, Ludhiana	

Seed Quantity	: 10 g	Total centres	: 26
Seed supply	: 30 <sup>th</sup> May (26+3)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replications	: 4
Spacing	: 60 × 50 cm		

### 3. Cherry Tomato AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	Phule Jayshree	2018	MPKV, Rahuri	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH), Palampur <b>II:</b> Kalyani, Jorhat <b>III:</b> Barapani, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana,
2.	DPCTY-1	2018	CSK HPKV, Palampur	
3.	IIHR -2858	2018	IIHR, Bengaluru	
4.	IIHR -2862	2018	IIHR, Bengaluru	
5.	Pusa Cherry Tomato-1(C)	-	IARI, New Delhi	



6.	Swarn Ratan (C)	-	RCER, RC, Ranchi	IIVR, Kalyanpur <b>V:</b> Raipur, Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Anand <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)
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Seed Quantity	: 10 g	Total centres	: 27
Seed supply	: 30 <sup>th</sup> May (27+3)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replications	: 4
Spacing	: 60 × 50 cm		

#### 4. Tomato (Indeterminate) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	KS-266	2018	CSAUA&T, Kalyanpur	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH), Solan, Palampur <b>III:</b> Barapani, Portblair, <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Bhubaneshwar (OUAT), Hyderabad <b>VI:</b> Junagadh, Hisar, IARI, Navsari <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	Punjab Swarna	2018	PAU, Ludhiana	
3.	VRT-50	2018	IIVR, Varanasi	
4.	DPT-1	2018	Palampur	
5.	DPT-2	2018	Palampur	
6.	VRT-51	2018	IIVR, Varanasi	
7.	NTL-12-01	2018	NAU, Navasari	
8.	Arka Vikash (C)	-	IIHR, Bengaluru	

Seed Quantity	: 10 g	Total centres	: 28
Seed supply	: 30 <sup>th</sup> May(28+3)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replications	: 4
Spacing	: 60 × 50 cm		

#### 5. Chilli /Hot Pepper- AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	CITH-HP-111-1	2018	CITH, Srinagar	<b>I:</b> Srinagar (SKU), Pantnagar, Srinagar (CITH), Palampur, <b>II:</b> Jorhat, Kalyani, Cooch Bihar <b>IV:</b> Ludhiana, IIVR, Ranchi <b>V:</b> Raipur, Bhubaneshwar (OUAT), Lam <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Parbhani, Rahuri, Jabalpur, Goa <b>VIII:</b> IIHR, , Coimbatore, Bagalkot (UHS),
2.	VRC-14	2018	IIVR, Varanasi	
3.	VRC-16	2018	IIVR, Varanasi	
4.	BC-14-2	-	Bhubaneshwar (OUAT)	
5.	Kashi Anmol (C)	-	IIVR, Varanasi	
6.	LCA-334(C)	-	CCS HRS, Lam	

Seed quantity	: 50g	Total Centres	: 23
Seed supply	: 30 <sup>th</sup> May (23+3 pkt)	Design	: RBD
Plot size	: 4.2 × 3.5 m	Replication	: 3
Spacing	: 60 × 50 cm		

### 6. Capsicum AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	DIBER -75	2018	DIBER, Pithoragarh	<b>I:</b> Srinagar (SKAUST), Solan, Srinagar (CITH), Palampur, VPKAS, Pithoragarh <b>II:</b> Jorhat, Kalyani, Cooch Bihar <b>IV:</b> Ludhiana, IIVR, Ranchi <b>V:</b> Bhubaneswar (OUAT) <b>VI:</b> IARI, Hisar, Anand <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS),
2.	SH-SPH-7	2018	SKAUST, Srinagar	
3.	CITH-SP-4	2018	CITH, Srinagar	
4.	PAUSAM-3	2018	PAU, Ludhiana	
5.	Pusa Deepti (C)	-	IARI, New Delhi	
6.	Nishant -I(C)	-	SKUAS&T, Srinagar	

Seed Quantity	: 10 g	Total centres	: 22
Seed supply	: 30 <sup>th</sup> May (22+3)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replications	: 4
Spacing	: 60 × 50 cm		

### 7. Cabbage AVT-I

Sl. No.	Entry	Year	Source	Conducting centres
1.	KTCB-52	2018	IARI (RS), Katrain	<b>I :</b> Palampur, Solan, Srinagar (SKU), IARI (Katrain), Pithoragarh <b>III:</b> Barapani, Pashighat <b>IV:</b> IIVR, Ludhiana <b>VI</b> IARI, Durgapura <b>VII:</b> Jabalpur <b>VIII:</b> Coimbatore, Periyakulam
2.	KTCB-121	2018	IARI (RS), Katrain	
3.	KGAT-1	2018	CSKHPKV, Palampur	
4.	DPC-1	2018	CSKHPKV, Palampur	
5.	PA-2	2018	IARI, New Delhi	
6.	KGMR-1(C)	-	IARI, Katrain	
7.	Quisto (C)	-	Syngenta Seeds	

Seed quantity	: 5g	Total Centres	: 14
Seed supply	: 30 <sup>th</sup> May (14+3 pkt)	Design	: RBD
Plot size	: 4.2 x 3.5m	Replication	: 3
Spacing	: 60 x 50 cm		

### 8. Cauliflower (Mid) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	KTCF-4	2018	IARI (RS), Katrain	<b>I :</b> Palampur, Solan, Srinagar, IARI (Katrain), Pithoragarh <b>III:</b> Barapani, Passighat <b>IV:</b> IIVR, Ludhiana, Sabour <b>VI</b> IARI, Durgapura <b>VII:</b> Jabalpur, Rahuri
2.	KTCF-2	2018	IARI (RS), Katrain	
3.	VRCF-104	2018	IIVR, Varanasi	
4.	VRCF-202	2018	IIVR, Varanasi	
5.	DCML-453	2018	IARI, New Delhi	
6.	DCML-411	2018	IARI, New Delhi	
7.	Pusa Sharad(C)	-	IARI, New Delhi	

Seed quantity	: 10 g	Total Centres	: 14
Seed supply	: 30 <sup>th</sup> June (14+3 pkt)	Design	: RBD
Plot size	: 3.00 × 2.0 m	Replication	: 3
Spacing	: 60 × 50 cm	Sowing Time: Zone I: March/ April; Other Zones: July/August	

**9. Lettuce AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	DL Sel-36	2018	IARI, New Delhi	<b>I :</b> Palampur, Solan, Srinagar (SKU), IARI (Katrain), Pithoragarh <b>III:</b> Barapani, Passighat <b>IV:</b> IIVR, Ludhiana <b>VI</b> IARI, Durgapura <b>VII:</b> Jabalpur
2.	DL Sel-13	2018	IARI, New Delhi	
3.	SOL-LET-1	2018	YSPUH&F, Solan	
4.	SOL-LET-2	2018	YSPUH&F, Solan	
5.	Great lakes(C)	-	IARI, Katrain	
6.	Chinease Yellow(C)	-	IARI, Katrain	

Seed quantity	: 10 g	Total Centres	: 12
Seed supply	: 30 <sup>th</sup> Oct. (12+3 pkt)	Design	: RBD
Plot size	: 4.0 × 3.0 m	Replication	: 4
Spacing	: 40 × 30 cm		

**10. Dolichos bean (Bush) AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	VRB Sem-207	2018	IIVR, Varanasi	<b>I:</b> Srinagar (SKU), Pantnagar <b>IV:</b> Ludhiana, IIVR, Ranchi, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Raipur, Lam <b>VI:</b> IARI, Hisar, Durgapura, Karnal (NHRDF), Navsari <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Bagalkot (UHS), IIHR, UAS-Bengaluru, Vellanikkara
2.	VRB Sem-08	2018	IIVR, Varanasi	
3.	GNIB-22	2018	NAU, Navsari	
4.	HA-5	2018	UAS, Bengaluru	
5.	Arka Jay (C)	2018	IIHR, Bengaluru	
6.	Konkan Bhushan (C)	-		

Seed Quantity	: 150 g	Total centres	: 21
Seed supply	: 20 <sup>th</sup> May (21+3 pkt)	Design	: RBD
Plot size	: 3.6 × 3.0 m	Replications	: 4
Spacing	: 45 × 30 cm		

**11. Dolichos bean (Pole) AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	Arka Krishna	2018	IIHR, Bengaluru	<b>I:</b> Srinagar (SKU), Pantnagar <b>IV:</b> Ludhiana, IIVR, Ranchi, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Raipur, Lam <b>VI:</b> Hisar, Durgapura, Junagadh, IARI <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Bagalkot (UHS), IIHR, Vellanikkara
2.	Arka Pradhan	2018	IIHR, Bengaluru	
3.	DB-23	2018	IARI, New Delhi	
4.	RHRDBP-04	2018	MPKV, Rahuri	
5.	RHRDBP-05	2018	MPKV, Rahuri	
6.	GJIB-15-03	2018	JAU, Junagadh	
7.	GJIB-15-04	2018	JAU, Junagadh	
8.	Kashi Haritma (C)	-	IIVR, Varanasi	
9.	Swarn Utkristi (C)	-	RCER, RC, Ranchi	

Seed Quantity	: 150g	Total centres	: 19
Seed supply	: 20 <sup>th</sup> May (19+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replications	: 3
Spacing	: 150 × 75 cm		

### 12. Garden Pea (Early) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	KS-683	2018	CSAUA&T, Kalyanpur	<b>I:</b> Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar <b>III:</b> Nagaland, Passighat <b>IV:</b> IIVR, Ludhiana, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	GP- 1102	2018	IARI, New Delhi	
3.	VP- 1423	2018	VPKAS, Almora	
4.	VP- 1513	2018	VPKAS, Almora	
5.	Matar Ageta7 (C)	-	PAU, Ludhiana	
6.	AP-3(C)	-	CSAUA&T, Kalyanpur	
7.	VRP-6(C)	-	IIVR, Varanasi	

Seed Quantity	: 300 g	Total centres	: 20
Seed supply	: 30 <sup>th</sup> June (20+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m	Replications	: 3
Spacing	: 30 × 10 cm		

### 13. Garden Pea (Mid) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	VP -1218	2018	VPKAS, Almora	<b>I:</b> Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar <b>III:</b> Nagaland, Passighat <b>IV:</b> IIVR, Ludhiana, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	VP-1242	2018	VPKAS, Almora	
3.	Punjab-90	2018	PAU, Ludhiana	
4.	VRPM-903	2018	IIVR, Varanasi	
5.	DPP-SP-6	2018	CSK HPKV, Palampur	
6.	VRP-7(C)	-	IIVR, Varanasi	
7.	PC-531(C)	-	PAU, Ludhiana	
8.	AP-1 (C)	-	CSAUA&T, Kalyanpur	

Seed Quantity	: 300 g	Total centres	: 20
Seed supply	: 30 <sup>th</sup> June (21+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m,	Replications	: 3
Spacing	: 30 × 10 cm		

### 14. Pea (Edible Pod) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	VPSP-1301	2018	VPKAS, Almora	<b>I:</b> Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar <b>III:</b> Nagaland, Passighat, <b>IV:</b> IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	VPSP-906-1	2018	VPKAS, Almora	
3.	DPEPP-15-1	2018	CSK HPKV, Palampur	
4.	DPEPP-10-1	2018	CSK HPKV, Palampur	
5.	Arka Apoorva	2018	IIHR, Bengaluru	
6.	VRP-6(C)	-	IIVR, Varanasi	
7.	VL -Ageti Matar(C)	-	VPKAS, Almora	

Sl. No.	Entry	Year	Source	Centres
8.	Arka Sampurna(C)	-	IIHR, Bengaluru	

Seed Quantity	: 300 g	Total centres	: 21
Seed supply	: 30 <sup>th</sup> June (21+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m,	Replications	: 3
Spacing	: 30 × 10 cm		

**15. Bitter gourd -AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	BBG 17-1	2018	OUAT, Bhubaneswar	<b>I</b> : Pantnagar, Pithoragarh <b>III</b> : Nagaland, Barapani <b>IV</b> : IIVR, Ludhiana, Allahabad, Ranchi <b>V</b> : Bhubaneshwar (OUAT) <b>VI</b> : IARI, Hisar, Rahuri <b>VIII</b> : Coimbatore
2.	HK-127	2018	CCSHAU, Hisar	
3.	VRBTG-5	2018	IIVR, Varanasi	
4.	VRBTG-10	2018	IIVR, Varanasi	
5.	Arka Harit(C)	-	IIHR, Bengaluru	
6.	NBGH-167(C)	-	NDUA&T, Faizabad	
7.	Kalyanpur Sona(C)	-	CSAUA&T, Kalyanpur	

Seed quantity	: 100 g	Total Centres	: 13
Seed supply	: 30th Oct. (13+3 pkt)	Design	: RBD
Plot size	: 7.5 x 3.0 m	Replication	: 4
Spacing	: 150 x 75 cm		

**16. Bottle gourd AVT-I**

Sl. No.	Entries	Year	Source	Centres
1.	NDBG-21	2018	NDUA&T, Faizabad	<b>I</b> : Srinagar (SKU), Pantnagar, Pithoragarh, Jammu <b>III</b> : Barapani, Portblair <b>IV</b> : Ranchi, Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad, <b>V</b> : Raipur, Bhubaneshwar (OUAT), Hyderabad <b>VI</b> : IARI, Junagadh, Navsari <b>VII</b> : Rahuri, Chitrakoot, Jabalpur, Parbhani <b>VIII</b> : Coimbatore, Bagalkot (UHS), IIHR, Karaikal
2.	NDBG-22	2018	NDUA&T, Faizabad	
3.	VRBG-2-1	2018	IIVR, Varanasi	
4.	VRBG-4	2018	IIVR, Varanasi	
5.	Kashi Ganga (C)	-	IIVR, Varanasi	
6.	Arka Bahar (C)	-	IIHR, Bengluru	
7.	Pusa Navin (C)	-	IARI, New Delhi	

Seed quantity	: 50 g	Total Centres	: 27
Seed supply	: 30 <sup>th</sup> Oct. (27+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 300 × 75 cm		

### 17. Sponge gourd-AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	VRSG-17-3	2018	IIVR, Varanasi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad
2.	VRSG-57	2018	IIVR, Varanasi	
3.	AHSG/2015/F5/01	2018	CIAH, Bikaner	<b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur
4.	DSG-33	2018	IARI, New Delhi	
5.	Pusa Supriya (C)		IARI, New Delhi	<b>VI:</b> IARI, Junagadh, Anand, Durgapura, CIAH
6.	Kashi Divya (C)		IIVR, Varanasi	
7.	Kashi Shreya (C)/ VRSG-194		IIVR, Varanasi	<b>VIII:</b> Coimbatore, Karaikal

Seed quantity	: 100 g	Total Centres	: 16
Seed supply	: 30 <sup>th</sup> Oct. (16+3 pkt)	Design	: RBD
Plot size	: 7.5 x 3.0 m	Replication	: 4
Spacing	: 150 x 60 cm		

### 18. Cucumber AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	Punjab Kheera-1	2018	PAU, Ludhiana	<b>I:</b> Solan, Pantnagar, Pithoragarh
2.	BRCU-1	2018	BAU, Sabour	
3.	VRCU-Sel-12-02	2018	IIVR, Varanasi	<b>III:</b> Nagaland, Barapani
4.	VRCU-Sel-13-19	2018	IIVR Varanasi	
5.	DGCH-64	2018	IARI, New Delhi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad
6.	Pant Kheera 1 (C)	-	GBPAU&T Pantnagar	
7.	Pusa Sanyog (C)	-	IARI, New Delhi	<b>V:</b> Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Anand, Durgapura, <b>VIII:</b> IIHR, Coimbatore, Karikal

Seed quantity	: 50 g	Total Centres	: 19
Seed supply	: 30th October (19+3 pkt)	Design	: RBD
Plot size	: 4.5 x 3.0 m	Replication	: 3
Spacing	: 150 x 50 cm		

### 19. Pumpkin AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	NDPK-S-1	2018	NDUA&T, Faizabad	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi
2.	NDPK-S-2	2018	NDUA&T, Faizabad	
3.	VRPK-18-01	2018	IIVR, Varanasi	<b>V:</b> Hyderabad, Raipur, Bhubaneswar (OUAT)
4.	VRPK-18-09	2018	IIVR, Varanasi	
5.	Kashi Harit (C)	-	IIVR, Varanasi	<b>VI:</b> IARI, Durgapura
6.	Narendra Agrim (C)	-	NDUA&T, Faizabad	
7.	Pusa Visesh (C)	-	IARI, New Delhi	<b>VII:</b> Parbhani, Rahuri, Jabalpur, Akola <b>VIII:</b> IIHR, Coimbatore, Karikal
		-		

Seed quantity	: 100 g	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 7.5 x 3.0 m	Replication	: 4
Spacing	: 300 x 60 cm		

**20. Long Melon - AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	DLM-27	2018	IARI, New Delhi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi <b>V:</b> Hyderabad, Bhubaneswar (OUAT) <b>VI:</b> IARI, Anand, Durgapura, CIAH <b>VIII:</b> Coimbatore, IIHR
2.	Thar Sheetal (AHLM-2)	2018	CIAH, Bikaner	
3.	Durga L.M.-28	2018	RARI, Durgapura	
4.	Durga L.M.-1	2018	RARI, Durgapura	
5.	Punjal long –M-1(C)	-	PAU, Ludhiana	
6.	Arka sheetal(C)	-	IIHR, Bengaluru	

Seed quantity	: 50 g	Total Centres	: 13
Seed supply	: 30 <sup>th</sup> Oct. (13+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spsacing	: 150 × 75 cm		

**21. Radish AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	DPR-1	2018	Palampur	<b>I:</b> Palampur, Solan Srinagar, Pithoragarh, CITH Mukteshwar <b>II:</b> Kalyani, Cooch Behar, Jorhat <b>III:</b> Barapani, Pashighat, Tripura, Nagaland <b>IV:</b> IIVR, Ludhiana, Sabour <b>VI:</b> IARI, Durgapura <b>VII:</b> Jabalpur, Rahuri <b>VIII:</b> Coimbatore, IIHR
2.	VRRAD-200	2018	IIVR, Varanasi	
3.	VRRAD-203	2018	IIVR, Varanasi	
4.	RL-22	2018	PAU, Ludhiana	
5.	Kashi Shweta (C)	-	IIVR, Varanasi	
6.	Kashi Hans (C)	-	IIVR, Varanasi	
7.	Japani white (C)	-	IARI, New Delhi	

Seed quantity	: 10 g	Total Centres	: 21
Seed supply	: 30th May (21+3 pkt)	Design	: RBD
Plot size	: 3.2 × 3.0 m,	Replications	: 4
Spacing	: 40 × 10 cm		

**22. Mustard Green/Laipatta (*Brassica juncea*) AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	Narendra Dev Sarson Sag-1	2018	NDUA&T, Faizabad	<b>I:</b> Palampur, Solan Srinagar, DIBER, CITH Mukteshwar <b>II:</b> Kalyani, Cooch Behar, Jorhat <b>III:</b> Barapani, Pashighat, Tripura, Nagaland <b>IV:</b> IIVR, Ludhiana, Sabour, Faizabad <b>VI:</b> IARI, Durgapura <b>VII:</b> Jabalpur, Rahuri <b>VIII:</b> Coimbatore
2.	NUGM-6	2018	SASRD, Nagaland	
3.	NUGM-8	2018	SASRD, Nagaland	
4.	CITH-M-LP-1	2018	CITH Mukteshwar	
5.	CITH-M-LP-2	2018	CITH Mukteshwar	
6.	Pusa sag-1(C)	-	IARI (RS), Katrain	
7.	UHF VR-12-1 (C)	-	Ranichauri	

Seed quantit	: 10 g	Total Centres	: 21
Seed supply	: 30 <sup>th</sup> May (21+3 pkt)	Design	: RBD
Plot size	: 3.2 × 3.0 m,	Replications	: 3
Spacing	: 20 × 10 cm		

### C. AVT-II Trials

#### Brinjal (Long) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	IVBL 25	2017	IIVR, Varanasi	<b>I:</b> Srinagar (SKU), Srinagar (CITH), Solan, Pantnagar <b>II:</b> Kalyani, Cooch Behar, Jorhat <b>III:</b> Barapani, Portblair, Nagaland <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur, Faizabad <b>V:</b> Raipur, , Hyderabad <b>VI:</b> IARI, Junagadh, Anand, Navsari <b>VII:</b> Jabalpur, Parbhani, Goa <b>VIII:</b> Coimbatore, IIHR
2.	PB-111	2017	GBPUAT, Pantnagar	
3.	PB-112	2017	GBPUAT, Pantnagar	
4.	NDB White-1	2017	NDUAT, Faizabad	
5.	DBL-60	2017	IARI, New Delhi	
6.	DBL-17	2017	IARI, New Delhi	
7.	PBL-235	2017	PAU, Ludhiana	
8.	Kashi Taru (C)	-	IIVR, Varanasi	
9.	Pb. Sadabahar (C)	-	PAU, Ludhiana	
10.	Local (C)	-		

Seed Quantity	: 10 g	Total centres	: 27
Seed supply	: 30th May (27+3 pkt)	Design	: RBD
Plot size	: 4.5 × 4.2 m	Replications	: 3
Spacing	: 75 × 60 cm		

#### 3. Brinjal (Round) AVT-II

Sl.No.	Entry	Year	Source	Centres
1.	IVBR-18	2017	IIVR, Varanasi	<b>I:</b> Srinagar (SKU), Pantnagar, Srinagar (CITH) <b>II:</b> Kalyani, Jorhat <b>III:</b> Barapani, Portblair, Nagaland <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Hyderabad, Bhubanewar <b>VI:</b> IARI, Junagadh, Hisar, Navsari <b>VII:</b> Jabalpur, Parbhani, Rahuri, Goa, Akola <b>VIII:</b> Coimbatore, IIHR
2.	DBR-22	2017	IARI, New Delhi	
3.	DBR-181	2017	IARI, New Delhi	
4.	Brinjal Round	2017	PDKV, Akola	
5.	PBR-4225	2017	PAU, Ludhiana	
6.	BBV-1-17	2017	BBSR, OUAT, Bhubaneshwar	
7.	JBR-14-07	2017	JAU, Junagadh	
8.	Pusa Kranti (C)	-	IARI, Varanasi	
9.	KS-224 (C)	-	CSKUA&T, Kalyanpur	
10.	Swarna Mani (C)	-	RCER, RC, Ranchi	
11.	Local (C)	-		

Seed quantity	: 10g	Total Centres	: 27
Seed supply	: 30 <sup>th</sup> May (27+3 pkt)	Design	: RBD
Plot size:	: 4.5 × 4.2 m	Replication	: 3
Spacing	: 75 × 60 cm		



**4. Brinjal Small Round AVT-II**

Sl. No.	Entry	Year	Source	Centres
1.	PBSR-9322	2017	PAU, Ludhiana	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) <b>III:</b> Barapani, Pasighat, Portblair, Nagaland <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Anand, Navsari, <b>VII:</b> Parbhani, Rahuri, Jabalpur, Akola <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	AB-15-07	2017	AAU, Anand	
3.	AB-15-08	2017	AAU, Anand	
4.	IVBSR-1	2017	IIVR, Varanasi	
5.	AKB-46	2017	Akola	
6.	Punjab Nageena	2017	PAU, Ludhiana	
7.	Aruna (C)	-	PDKV, Akola	
8.	Local (C)	-		

Seed quantity	:	10g	Total Centres	:	30
Seed supply	:	30 <sup>th</sup> May (30+3 pkt)	Design	:	RBD
Plot size	:	4.5 × 4.2 m	Replication	:	4
Spacing	:	75 × 60 cm			

**5. Tomato (Determinate) AVT-II**

Sl. No.	Entry	Year	Source	Centres
1.	NTL 12-07	2017	NAU, Navsari	<b>I:</b> Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) <b>III:</b> Barapani, Pasighat, Portblair, Nagaland <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh, Hisar, Anand, Navsari, <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	VRT-06	2017	IIVR, Varanasi	
3.	VRT-13	2017	IIVR, Varanasi	
4.	PAU-2381	2017	PAU, Ludhiana	
5.	ALT-10-04	2017	RS AAU, Anand	
6.	ALT-16-06	2017	RS AAU, Anand	
7.	JTL-12-02	2017	JAU, Junagadh	
8.	JTL-15-05	2017	JAU, Junagadh	
9.	Kashi Aman (C)	-	IIVR, Varanasi	
10.	Punjab Ratta (C)	-	PAU, Ludhiana	
11.	Local (C)	-		

Seed Quantity	:	10 g	Total centres	:	29
Seed supply	:	30 <sup>th</sup> May (29+3 pkt)	Design	:	RBD
Plot size	:	4.8 × 4.0 m	Replications	:	3
Spacing	:	60 × 50 cm			

## 6. Cauliflower (Mid) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	KT-37	2017	IARI, Katrain	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar, Palampur <b>IV:</b> IIVR, Ludhiana, Sabour, RPCAU-Pusa, Ranchi <b>VI:</b> IARI, Junagadh, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani
2.	DPCaY-7	2017	CSK HPKV, Palampur	
3.	Palam Upahar	2017	CSK HPKV, Palampur	
4.	RMCF-1	2017	RPCAU, Pusa, Bihar	
5.	RMCF-5	2017	RPCAU, Pusa, Bihar	
6.	VRCF-102	2017	IIVR, Varanasi	
7.	Pusa Sharad (C)	-	IARI, New Delhi	
8.	Kashi Agahani (C)	-	IIVR, Varanasi	
9.	Local (C)	-		

Seed quantity : 10 g  
 Seed supply : 30<sup>th</sup> June (17+3 pkt)  
 Plot size : 3.00 × 2.0 m  
 Spacing : 60 × 50 cm

Total Centres : 17  
 Design : RBD  
 Replications : 4  
 Sowing Time: Zone I: March/ April; Other Zones: July/August

## 7. French bean (Pole) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	PFBP-15	2017	GBPUAT, Pantnagar	<b>I:</b> Srinagar (SKU), Pantnagar, Solan, Nagaland, Katrain, Ranichauri, Mukteswar (CITH) <b>IV:</b> Ludhiana, IIVR, Ranchi, Sabour <b>V:</b> Bhubaneswar (OUAT), Raipur <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Bagalkot (UHS), IIHR
2.	PFBP-25	2017	GBPUAT, Pantnagar	
3.	PFBP-28	2017	GBPUAT, Pantnagar	
4.	BSRB-1-17	2017	BBSR, OUAT, Bhubaneswar	
5.	Laxami (P-7)	2017	YSPUH&F, Solan	
6.	Swarna Priya (C)	-	RCER, RC, Ranchi	
7.	SVM-1 (C)	-	Solan	
8.	Local (C)			

Seed Quantity : 200 g  
 Seed supply : 20<sup>th</sup> May (18+3 pkt)  
 Plot size : 4.0 × 3.0 m  
 Spacing : 50 × 20 cm

Total centres : 18  
 Design : RBD  
 Replications : 4

## 8. Dolichos bean (Bush) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	GNIB 21	2017	NAU, Navsari	<b>I:</b> Srinagar (SKU), Pantnagar, Solan, <b>IV:</b> Ludhiana, IIVR, Ranchi, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Raipur, Lam <b>VI:</b> IARI, Hisar, Durgapura, NHRDF(Nasik), Navsari <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Bagalkot (UHS), IIHR, Vellanikkara
2.	NIBD 14-01	2017	NAU, Navsari	
3.	VRBSEM-18	2017	IIVR, Varanasi	
4.	VRBSEM-14	2017	IIVR, Varanasi	
5.	Arka Soumya	2017	IIHR, Banagalore	
6.	Arka Vijay (C)	-	IIHR, Banagalore	
7.	Arka Jay (C)	-	IIHR, Banagalore	
8.	Local (C)	-		

Seed Quantity : 150 g  
 Seed supply : 20<sup>th</sup> May (21+3 pkt)  
 Plot size : 3.6 × 3.0 m  
 Spacing : 45 × 30 cm

Total centres : 21  
 Design : RBD  
 Replications : 3

**9. Dolichos bean (Pole) AVT-II**

Sl. No.	Entry	Year	Source	Centres
1.	Arka Vistar	2017	IIHR, Bangaluru	<b>I:</b> Srinagar (SKU), Solan, Ranichauri <b>II:</b> Kalyani <b>IV:</b> Ludhiana, IIVR, Ranchi <b>V:</b> Bhubaneswar (OUAT), Raipur, Lam <b>VI:</b> IARI, Durgapura, NHRDF (Nasik), Junagadh <b>VII:</b> Jabalpur, Rahuri, Parbhani, Akola <b>VIII:</b> Bagalkot (UHS), IIHR, Vellanikkara
2.	DB-22	2017	IARI, New Delhi	
3.	GJIB-13-07	2017	JAU, Junagadh	
4.	Kashi Haritima (C)	-	IIVR, Varanasi	
5.	Pusa Early Prolific (C)	-	IARI, New Delhi	
6.	Swarna Utkrist (C)	-	RCER, RC, Ranchi	
7.	Local (C)	-	-	

Seed Quantity	: 150g	Total centres	: 21
Seed supply	: 20 <sup>th</sup> May (21+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replications	: 4
Spacing	: 150 × 75 cm		

**10. Garden Pea (Early) AVT-II**

Sl. No.	Entry	Year	Source	Centres
1.	VP-1429	2017	VPKAS, Almora	<b>I:</b> Solan, Almora, Pantnagar, Pithoragarh, Ranichauri, Srinagar (SKU) <b>III:</b> Nagaland, Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi <b>VI:</b> IARI, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	GP-1001	2017	IARI, New Delhi	
3.	Arka Nirmal	2017	IIHR, Bangaluru	
4.	VRPE-105	2017	IIVR, Varanasi	
5.	AP-3 (C)	-	CSAUA&T, Kalyanpur	
6.	Kashi Uday(C)	-	IIVR, Varanasi	
7.	Local (C)	-		

Seed Quantity	: 300 g	Total centres	: 21
Seed supply	: 30 <sup>th</sup> June (18+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m	Replications	: 3
Spacing	: 30 × 10 cm		

### 11. Garden Pea (Mid) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	VP-1018	2017	VPKAS, Almora	<b>I:</b> Solan, Almora, Palampur, Pithoragarh, Ranichauri <b>III:</b> Nagaland, Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	VP-1437	2017	VPKAS, Almora	
3.	Line 1-2	2017	CSK HPKV, Palampur	
4.	DPP-SP-22	2017	CSK HPKV, Palampur	
5.	VRPE-905	2017	IIVR, Varanasi	
6.	VRP-7 (C)	-	IIVR, Varanasi	
7.	PC 531(C)	-	PAU, Ludhiana	
8.	Local (C)	-		

Seed Quantity	: 300 g	Total centres	: 21
Seed supply	: 30 <sup>th</sup> June (21+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m	Replications	: 3
Spacing	: 30 × 10 cm		

### 12. Ridge gourd- AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	AHRG-29	2017	CIAH, Bikaner	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Navsari, Anand, Durgapura, CIAH <b>VIII:</b> IIHR, Coimbatore, Karikal
2.	Arka Prasan	2017	IIHR, Bangaluru	
3.	DRG-7	2017	IARI, New Delhi	
4.	VRRG-6A	2017	IIVR, Varanasi	
5.	Pusa Nasdar (C)	-	IARI, New Delhi	
6.	Kashi Shivani (C)	-	IIVR, Varanasi	
7.	Local (C)	-		

Seed quantity	: 100 g	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 300 × 60 cm		

### 13. Sponge gourd-AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	JSG-14-01	2017	JAU, Junagadh	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Navsari, Anand, Durgapura <b>VIII:</b> IIHR, Coimbatore, Karikal
2.	JSG- 14-06	2017	JAU, Junagadh	
3.	VRSG-17-1	2017	IIVR, Varanasi	
4.	VRSG-17-2	2017	IIVR, Varanasi	
5.	Pusa Supriya (C)	-	IARI, New Delhi	
6.	Kashi Divya (C)	-	IIVR, Varanasi	
7.	Local	-		

Seed quantity	: 100 g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> Oct. (17+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 300 × 60 cm		

**Observations to be recorded****Solanaceous crops****Brinjal**

Days to first marketable fruit maturity	Total Marketable fruit Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) (to be taken from 5 fruits between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking)	Fruit length (cm) (to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with measuring scale)	Fruit Diameter (cm) (to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with vernier callipers)	Fruit color (to be taken at market maturity stage between 2 <sup>nd</sup> & 4 <sup>th</sup> picking)	Calyx colour (to be taken at market maturity stage between 2 <sup>nd</sup> & 4 <sup>th</sup> picking)	Phenol content of the fruit at marketable maturity (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses like <b>FSB, BW &amp; nematodes</b> as tolerant or susceptible
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**Capsicum (Bell pepper)**

Days to first marketable fruit harvest	Total Marketable fruit Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) (to be taken from 5 fruits between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking)	Fruit length (cm) (to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with Vernier Callipers)	Fruit diameter (cm) (to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with Vernier Callipers)	Fruit color To be taken at mature green Stage Between at 2 <sup>nd</sup> & 4 <sup>th</sup> picking (as light green, green or dark green)	No. of locules Per fruit (to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking)	Vitamin C Content (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses like <b>viruses, BW &amp; powdery mildew</b> as tolerant or susceptible
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### Chilli

Days to first red ripe fruit harvest	Total Marketable red ripe Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) to be taken from 20 fruits between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking	Fruit length (cm) to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with Vernier Callipers	Fruit diameter (cm) to be taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking with Vernier Callipers	Fruit color at mature green stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking (as light green, green or dark green)	Fruit color at mature red ripe stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking (as light red, red or dark red)	Pungency (organoleptic & biochemical analysis) at mature green stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Vit C Content (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses ( <b>LCV, powdery mildew &amp; fungal wilt</b> ) as tolerant or susceptible
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### Tomato

Days to first fruit picking	Total Marketable Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) taken from 10 fruits between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking	Fruit shape taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking	Equatorial Diameter (cm) taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking with Vernier Callipers	Polar Diameter (cm) taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking with Vernier Callipers	TSS ( <sup>0</sup> Brix) taken at red ripe stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Acidity % taken at red ripe stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> Picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Fruit firmness (kg/cm <sup>2</sup> ) taken at red ripe stage taken between 2 <sup>nd</sup> & 4 <sup>th</sup> picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses ( <b>LCV, BW &amp; Tosspovirus</b> ) as tolerant or susceptible
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**Cucurbitaceous crops****Ash gourd**

Days to first picking	Average fruit weight (should be recorded at the time of final harvesting of 5 fruits)	Fruits/plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/Cylindrical (should be recorded the time of final harvesting)	Reaction to major biotic stresses <b>(Downy mildew and anthracnose)</b> as tolerant or susceptible
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**Bitter gourd**

Days to first picking	Average fruit weight (should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking, average of 5 fruits at marketable maturity)	Fruits/plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour – Dark green/green/creamy : Should be assessed at the time of measurement of fruit length	Ridges on fruit : Continuous/ Discontinuous	Shape of fruit : spindle/ cylindrical/ globular	Reaction to major biotic stresses <b>(Powdery mildew, Leaf curl virus, Downy mildew )</b> as tolerant or susceptible
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**Bottle gourd**

Days to first picking	Average fruit weight (should be recorded at 4 <sup>th</sup> /5 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruits/plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Colour of fruit : Green/light green/dark green with or without patches	Shape of fruit : Round/cylindrical/club/others (specify)	Reaction to major biotic stresses <b>(Powdery mildew, gummy stem blight and anthracnose )</b> as tolerant or susceptible
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### Cucumber

Days to first picking	Average fruit weight (should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking of 5 fruits at marketable maturity)	Fruit length (should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking: average of 5 fruits at marketable maturity)	Fruit diameter in middle (should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking: average of 5 fruits at marketable maturity)	Fruits/plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour – Dark green with or without stripes (white tinge)/Light green with or without stripes (white tinge)/Creamy/Others : should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking at marketable maturity	Bitterness (should be assessed in the middle of fruit) (should be recorded at 2 <sup>nd</sup> /3 <sup>rd</sup> picking)	Reaction to major biotic stresses ( <b>downy mildew, powdery mildew, mosaic virus</b> ) as tolerant or susceptible
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### Pumpkin

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/plant	Marketable yield (q/ha)	Colour of fruit : Cream/Dark Green/light green with or without mottles at immature stage	Shape of fruit : Flat round/ Round/Oval/Cylindrical	Flesh colour : cream/yellow/ orange : should be recorded at full mature stage	Flesh thickness (cm) : should be recorded at full mature stage	Reaction to major biotic stresses ( <b>ZYMV, PRSV</b> ) as resistant or susceptible
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### Ridge gourd

Days to first picking	Average fruit weight (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruits/plant	Fruit length (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruit diameter in middle of fruit (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Colour of fruit : Dark green/green/light green	Reaction to major biotic stresses ( <b>Powdery mildew, Leaf curl virus, Downy mildew &amp; fungal wilt</b> ) as tolerant or susceptible
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**Sponge gourd**

Days to first picking	Average fruit weight (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruit length (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruit diameter in middle of fruit (should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking, average of 5 fruits at marketable maturity)	Fruits/plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour Dark green/green/light green with or without stripes : should be recorded at 3 <sup>rd</sup> /4 <sup>th</sup> picking of 5 fruits at marketable maturity	Reaction to major biotic stresses <b>(Powdery mildew, Leaf curl virus, Downy mildew )</b> as tolerant or susceptible
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**Melons****Watermelon**

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/ Plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/elongate	Colour of fruit : Dark green/Light green with or without stripes/mottles	TSS: should be recorded at harvest of 5 fruits	Flesh colour: Dark red/Pink/yellow	Reaction to major biotic stresses <b>(Gummy stem blight, WBNV, Fusarium wilt)</b> as tolerant or susceptible
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**Muskmelon**

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/ plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/oval/flat globe	Colour of fruit : Green/ Cream/ Yellow/Brown	Fruit surface netting : Absent/ Present	Fruit sutures: Absent/ present	TSS: should be recorded at harvest of 5 fruits	Flesh colour: Cream/ white/ Orange/ Green	Reaction to major biotic stresses <b>(Gummy stem blight, Fusarium wilt, Downy mildew)</b> as tolerant or susceptible
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### Long melon

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/oval/flat globe	Fruit Girth (cm)	Fruit Length (cm)	No. of fruit /plant	Average fruit weight (g) Average of five fruits	Duration of crop ( Sowing to last harvest)	Reaction to major biotic stresses ( <b>Gummy stem blight, Fusarium wilt, Downey mildew</b> ) as tolerant or susceptible
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### Leguminaceous Vegetables

#### Pea Early (Sowing season: November in North and South India; and March in hills)

Days to first harvest	Total Marketable Yield q/ha (Data of all pickings to be pooled)	No of pods/plant (Data of all pickings to be pooled)	Selling (%) (Wt of green seeds ÷ wt of green pod) x100	Pod shape (Straight/ slightly curved)	Average pod weight (Avg. of 10 pods)	Total sugars	Pod length (cm) (Avg. of 10 pods)	<b>Biotic stress susceptibility</b>		
								Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root-knot galls/plant

#### Pea mid season: (Sowing season: November in North and South India; and March in hills)

Days to first harvest	Total Marketable Yield q/ha (Data of all pickings to be pooled)	No of pods/plant (Data of all pickings to be pooled)	Shelling (%) (Wt of green seeds ÷ wt of green pod) x100	Pod shape (Straight/ slightly curved)	Average pod weight (Avg. of 10 pods)	Total sugars	Pod length (cm) (Avg. of 10 pods)	<b>Biotic stress susceptibility</b>		
								Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root-knot galls/plant

**Cowpea (Season: Kharif)**

Days to first pod harvest	Marketable green pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green)	Pod cross-section shape (round or flat or oval)	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Pod stringiness (stringed or stringless)	Plant height (cm) Av of 10 plants	Pod weight (g) (Avg. of 20 fruits)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant
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**Yard Long Bean (Season: Kharif)**

Days to first pod harvest	Marketable green pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green)	Pod cross-section shape (round or flat or oval)	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Plant height (cm) Av of 10 plants	Pod weight (g) (Avg. of 20 fruits)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant
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**French bean (Bush and Pole): Sowing season: July in South India; November in North India; and February in hills**

Days to first pod harvest	Marketable pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green/ purple)	Pod cross-section shape (round or oval or flat)	Pod curvature (straight/curved/ slight curved)	Pod length (cm) (Avg. of 10 pods)	Pod Width (cm)	Pod weight (g) (Avg. of 20 pod)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant
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**Dolichos bean (Bush and Pole): (Season: Kharif for photo-insensitive types and rabi for photo sensitive type)**

Days to first pod harvest	Green pod yield q/ha	Number of pods / plant (Avg. of 10 plants)	Pod colour (white/ creamish/ light green/ greenish/ purple/ other)	Pod shape (straight/ curved/ intermediate)	Pod cross-section shape (flat/round )	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Pod weight (g) (Avg. of 10 pods)	Plant height (cm) Av of 10 plants	Disease incidence, if any (%)	Insect pest infestation , if any (%)	No. of root- knot galls/plant
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## Cruciferous vegetables

### **Cabbage**

Days of 50% heading	NHW (g) (Avg. of 5 heading)	MHW (g) (Avg. of 5 heading)	GPW (Avg. of 5 plants)	Market able head yield (q/ha)	Head color	Head compactness	Core length	Head polar (cm) (Avg. of 5 head)	Head equatorial length (cm) (Avg. of 5 head)	Head shape	Harvest Index	Day to Maturity	Disease incidence, if any (%)	Insect pest infestation, if any (%)
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NHW: Net head weight (without non-wrapper leaves); MHW: Marketable head weight (with 2-3 loosely covered non-wrapper leaves); GPW: Gross plant weight; Head colour: light green (LG), green (G), dark green (DG), purple (P); Head compactness:  $Z=C*100/W^3$  C= NHW in gram, W= Average of polar and equatorial dia (cm); Head shape: flat (F), round (R), oval (O); HI: Harvest index (NHW\*100/GPW); DTM: Days to maturity (transplanting to final harvest).

### **Cauliflower**

(Early season (>25 °C): Mid July-mid August transplanting in North India, Kharif in Hyderabad)

(Mid season (20-25 °C): September transplanting in North India, Late Kharif in Hyderabad)

(Late season (<12 °C): Mid-October to mid-November transplanting in North India, March in Hills)

Crop should get mentioned temperature at the time of curd initiation and development

Days to 50% curd formation	NCW (g) (Avg. of 5 curd)	MCW (g) (Avg. of 5 curd)	GPW (Avg. of 5 plants)	Marketable curd yield (q/ha)	Curd color	Curd compactness	Plant growth type	Curd length (cm) (Avg. of 5 curd)	Curd width (cm) (Avg. of 5 curd)	HI	DTM	Riceyness and leafiness (Present/absent)	Disease incidence, if any (%)	Insect pest infestation, if any (%)
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NCW: Net curd weight (without expanded leaves); MCW: Marketable curd weight (with 3-4 expanded leaves); Unmarketable yield includes ricey, leafy and fuzzy curds; GPW: Gross plant weight; Curd colour: Yellow (Y), creamish-white (CW), white (W), snow-white (SW); Curd compactness: Loose, Medium compact, Compact; Plant growth type: Spreading (S), Semi-spreading (SS), Self-blanching or semi-erect (SB); HI: Harvest index (NCW\*100/GPW); DTM: Days to maturity (transplanting to final harvest).

**Broccoli**

Days to 50% head formation	NCW (g) (Avg. of 5 head)	MCW (g) (Avg. of 5 head)	GPW (Avg. of 5 plants)	Marketable head yield (q/ha)	Head color	Head compactness	Head length (cm) (Avg. of 5 curd)	Head width (cm) (Avg. of 5 curd)	HI	DTM	Disease incidence, if any (%)	Insect pest infestation, if any (%)

NCW: Net head weight (without expanded leaves); MCW: Marketable head weight (with 3-4 expanded leaves); GPW: Gross plant weight; Head colour: Green (G), purple green (PG), others (OT); HI: Harvest index ( $NCW \times 100 / GPW$ ); DTM: Days to maturity (transplanting to final harvest).

**Radish**

Days to 1 <sup>st</sup> root harvest	Plant biomass (g) (Av of 10 plants)	Root weight (g) (Av of 10 plants)	Marketable yield (q/ha)	Root length (cm) (Av. of 10 roots)	Root dia at mid-portion (cm) (Av. of 10 roots)	Root colour (exterior)	Pithiness at harvest (present, absent)	Bolting (present, absent)	Disease incidence, if any (%)	Insect pest infestation, if any (%)

**Other vegetable crops:****Amaranth (*Kharif* sowing)**

Total biomass weight (kg/plot)	Plant height at 1 <sup>st</sup> cutting (cm)	Biomass yield (q/ha)	Leaf colour	Stem colour	Reaction to white rust

**Bathua (*Chenopodium*, Rabi sowing)**

Total biomass weight (kg/plot)	Plant height at 1 <sup>st</sup> cutting (cm)	Biomass yield (q/ha)	Leaf colour	Stem colour

### Carrot

Days to 1 <sup>st</sup> root harvest	Plant biomass (g) (Av of 10 plants)	Root weight (g) (Av of 10 plants)	Marketable root yield (q/ha)	Harvest Index	Root length (cm) (Av. of 10 roots)	Root dia at mid-portion (cm) (Av. of 10 roots)	Days to maturity	Root colour	% of self-coloured core	Secondary roots (absent, less, present)	Disease incidence, if any (%)	Insect pest infestation, if any (%)

### Okra (Kharif in North India, Late Summer in South India)

Plant height at last harvest (cm)	No. of ridge s /fruit	Av fruit wt (g)	Days to first harvest	Fruit length (cm)	Fruit dia at mid portion	No. of Fruit /plant	Average fruit weight	Fruit colour at marketable stage	Fruit texture (smooth/hairy)	Duration of Crops	Marketable yield (q/ha)	Disease incidence of YVMV and OELCV (%) at 30, 60 and 90 DAYS	Insect pest infestation (fruit borer, aphids and jassids (%))	Fusarium/Rhizoctonia wilt (%) incidence)	Remarks or any other important parameter

### Lettuce

Variety type ( heading / non heading)	Maturity days ( at final harvesting )	Days to first harvest	Plant height at last harvest (cm)	Leaf colour at marketable maturity (Light green, green, dark green,purple/red)	Marketable yield (g/plant)	Marketable yield (q/ha)	Disease incidence % ( lettuce drop, downy mildew, wilt)

## SESSION –IV

### Hybrid Evaluation

Chairperson	: Dr. K. E. Lawande, Former Vice Chancellor, BSKKV, Dapoli
Co-Chairperson	: Dr. L. Pugalendhi, Dean, HCRI, TNAU, Coimbatore
Convener	: Dr. N. Rai, PS, ICAR-IIVR, Varanasi
Rapporteurs	: Dr. H. Choudhary, PS, ICAR-IARI, New Delhi Dr. B. K. Singh, SS, ICAR-IIVR, Varanasi

The Chairman gave introductory remarks highlighting the importance of hybrids in different vegetable crops. He expressed his concern about missing data of many hybrids in IET/AVT-I/AVT-II trials due to non supply of the seeds from the source centres after formulation of the technical programmes of the respective crops. During the year 2017-18, a total of 413 trials were conducted. However, out of 483 trails allotted among 47 coordinating centres during the year 2018-19, results of only 121 could be reported and majority of trails (362) were under progress. This issue was discussed in detail and many centres expressed their inability to report due to varying environmental conditions in hilly regions and crop cycle of many vegetables did not get completed even in the plain also. **It was finally suggested to present the report of only previous year data of all the trails from next year onwards where data for all centres are being available and a cut off date for the sending of data should be fixed (probably September)** by PC cells so that more time can be given for analyzing and synthesizing of meaningful report from conducting such a voluminous trials. The report of hybrid trials on Solanaceous crops was reviewed and presented by Dr. A.S. Dhatt, Professor & Head, PAU, Ludhiana and Dr. Akhilesh Sharma, Professor & Head, CSKHPKV, Palampur reviewed and presented the reports of Cole crops, Okra and Cucurbitaceous vegetables for 2017-18 and 2018-19.

After thorough discussion following general suggestions were made.

#### Suggestions:

- Instead of presenting incomplete result of current year, it is better to present complete result of all trials of previous year. Decision was taken unanimously.
- More participation for entries of hybrids from public sector institutions should be emphasized in major crops especially Chilli (Rahuri, IIHR, IIVR, PAU, Lam), Cucurbits (IARI, IIVR, IIHR, Rahuri), Capsicum (IIHR, Katrain, Solan, Palampur) and Cabbage (Katrain, Solan).
- Online system for monitoring and timely reporting of the trails should be developed in consultations with other ICAR Institute/ICAR authority so that proper and timely monitoring can be done by PC Cell.
- There is a request that the coding of entries done by PC cell should be decoded every year during the annual workshop so that each breeding centre / private companies will be able to know the performance of their entries in different zone of the country. Poor performing centres should only be discussed in the special meeting by PC with ICAR authorities.
- A drastic variation in yield was observed at some centres for which they could not give logical explanation. Such centres are advised to take serious note and conduct the trials properly with utmost care. PC should ask written intimation from such centers.
- In recording ancillary observations, the guidelines set by AICRP (VC) while planning experiments, should be followed stringently for avoiding confusion at the time of compilation and reporting of data.

- It was observed that at some centres the trials are in progress, even after the normal cropping period and the sub-optimal yield of any centres should not be considered for discussion. The Project Coordinator should take stock of such centres separately. The centres are advised to shed casual approach and report on time.
- The chairman showed concerns about many emerging diseases of different vegetable crops like tospovirus in tomato, watermelon, enation leaf curl virus in okra and leaf curl in chilli and emphasized the greater participation of private sector to develop and test their hybrids.

**Recommendations:**

- The reason for failure of trials should be communicated immediately to the PC Cell with proper justification and appropriate photographs which should be reflected in the final reports.
- Besides yield, specific characters that are required for which the hybrids is proposed for testing, should be recorded properly.

The session ended with the vote of thanks to chair



**TECHNICAL PROGRAMME (2019-20)****A. IET -Hybrid Trials****1. Brinjal Hybrid Long- IET**

Sl. No.	Entry	Year	Source	Centres
1.	DBHL-2101	2019	IARI, New Delhi	<b>I:</b> Srinagar (SKUAS&T), Pantnagar, Pithoragarh <b>III:</b> Passighat, Portblair, Barapani <b>II:</b> Kalyani, Cooch Bihar, Jorhat <b>IV:</b> Ludhiana, IIVR, Kalyanpur, Faizabad, Ranchi <b>V:</b> Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura <b>VII:</b> Jabalpur, Parbhani, Rahuri <b>VIII:</b> Coimbatore, IIHR,
2.	DBHL-219	2019	IARI, New Delhi	
3.	IVBHL-23	2019	IIVR, Varanasi	
4.	RCBLH-20	2019	RCER, RC, Ranchi	
5.	NDBH-14-25	2019	NDUAT-Faizabad	
	Navina (C)	-	VNR Seeds	
	ARBH-786 (C)	-	Ankur Seeds	

Seed quantity	: 10g	Total Centres	: 24
Seed supply	: 30 <sup>th</sup> May (24+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 3
Spacing	: 75 × 60 cm		

**2. Brinjal Hybrid Round- IET**

Sl. No.	Entry	Year	Source	Centres
1.	DBHR-912	2019	IARI, New Delhi	<b>I:</b> Srinagar (SKUAS&T), Pantnagar, Pithoragarh <b>III:</b> Passighat, Portblair, Barapani <b>II:</b> Kalyani, Cooch Bihar, Jorhat <b>IV:</b> Ludhiana, IIVR, Kalyanpur, Ranchi <b>V:</b> Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura <b>VII:</b> Jabalpur, Parbhani, Rahuri <b>VIII:</b> Coimbatore, IIHR,
2.	DBHR-2019	2019	IARI, New Delhi	
3.	IVBHR-19	2019	IIVR, Varanasi	
4.	RCBRH-18	2019	RCER, Ranchi	
	PBHR-41(C)	-	PAU, Ludiana	
	HABH-8 (C)	-	RCER, Ranchi	

Seed quantity	: 10g	Total Centres	: 23
Seed supply	: 30 <sup>th</sup> May (23+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 4
Spacing	: 75 × 60 cm		

### 3. Tomato Hybrid Det. IET

Sl. No.	Entry	Year	Source	Centres
1.	VRT-14-11-12	2019	IIVR, Varanasi	<b>I:</b> Pantnagar, Almora, Jammu, Srinagar (CITH), Pithoragarh <b>III:</b> Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura, Junagadh <b>VII:</b> Rahuri, Jabalpur, Goa <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)
2.	CRPVRTH-16-70	2019	IIVR, Varanasi	
3.	VNR-15067	2019	VNR Seeds, Raipur	
4.	Julie	2019	VNR Seeds, Raipur	
5.	Arka Rakshak	2019	IIHR, Bengaluru	
6.	RCDTH-15	2019	RCER, RC, Ranchi	
	Kashi Aman (C)	-	TNAU, Coimbatore	
	Improved Bhagya (C)	-	Nuziveedu seeds	

Seed quantity	: 10g	Total Centres	: 22
Seed supply	: 30 <sup>th</sup> May (22+3 pkt)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replication	: 3
Spacing	: 60 × 50 cm		

### 4. Chilli Hybrid/Hot Pepper- IET

Sl. No.	Entry	Year	Source	Centres
1.	Shakti-51	2019	Divyashakti Seeds, Gujarat	<b>I:</b> Srinagar (SKU), Srinagar (CITH), Pantnagar <b>IV:</b> IIVR, Ludhiana, Allahabad <b>V:</b> Lam, Raipur, Hyderabad <b>VI:</b> IARI, Hisar <b>VII:</b> Rahuri, Parbhani, Jabalpur <b>VIII:</b> Coimbatore, IIHR, Bagalkot (UHS)
2.	NCH-1901	2019	Nirmal Seeds, Maharashtra	
3.	VNR-1270490	2019	VNR Seeds, Raipur	
4.	VNR-1270822	2019	VNR Seeds, Raipur	
	VNR Vidya (C)	-	VNR Seeds, Raipur	
	BSS-378 (C)	-	Beejo Sheetal, Jalna	

Seed quantity	: 20g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> May (17+3 pkt)	Design	: RBD
Plot size	: 4.2 × 3.5 m	Replication	: 4
Spacing	: 60 × 50 cm		

### 5. Cauliflower Hybrid (Early) IET

Sl. No.	Entry	Year	Source	Centres
1.	DCEH-312397	2019	IARI, New Delhi	<b>IV:</b> IIVR, Ludhiana, Sabour, <b>V:</b> Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani
2.	DCEH-1527	2019	IARI, New Delhi	
3.	VRCFH-1	2019	IIVR, Varanasi	
4.	VRCFH-2	2019	IIVR, Varanasi	
	Pusa Kartik Sankar (C)	-	IARI, New Delhi	
	Pusa Ashwani (C)	-	IARI, New Delhi	

Seed quantity	: 10 g	Total Centres	: 11
Seed supply	: 30 <sup>th</sup> May (11+3 pkt)	Design	: RBD
Plot size	: 2.25 × 1.2 m	Replication	: 4
Spacing	: 45 × 30 cm	Sowing Time	: June-July

## 6. Cauliflower Hybrid (Mid) IET

Sl. No.	Entry	Year	Source	Centres
1.	DCMH-1544	2019	IARI, New Delhi	<b>I:</b> Solan, Katrain, Srinagar (SKU), Pantnagar (Sowing March-April) <b>IV:</b> IIVR, Ludhiana, Sabour <b>V:</b> Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Hisar, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani
2.	DCMH-8405	2019	IARI, New Delhi	
3.	KTCFH-23	2019	IARI (RS), Katrain	
4.	KTCFH-40	2019	IARI (RS), Katrain	
5.	VRCFH-51	2019	IIVR, Varanasi	
	Pusa Hybrid-2 (C)	-	IARI, New Delhi	
	KTH-301 (C)	-	IARI (RS), Katrain	

Seed quantity	: 10 g	Total Centres	: 16
Seed supply	: 30 <sup>th</sup> June (16+3 pkt)	Design	: RBD
Plot size	: 3.00 × 2.0 m	Replication	: 3
Spacing	: 60 × 50 cm	Sowing Time: Zone I: March/ April; Other Zones: July/August	

## 7. Pumpkin Hybrid IET

Sl. No.	Entry	Year	Source	Centres
1.	NDPKH-12-1	2019	NDUA&T, Faizabad	<b>IV:</b> Ludhiana, IIVR, Kalyanpur, Faizabad <b>V:</b> Hyderabad, Raipur, Bhubaneswar (OUAT) <b>VI:</b> IARI, Durgapura, Hisar <b>VII:</b> Parbhani, Rahuri, Jabalpur <b>VIII:</b> Coimbatore, IIHR, Vellanikkara
2.	NDPKH-16-16	2019	NDUA&T, Faizabad	
3.	VNR-38-15	2019	VNR Seeds, Raipur	
4.	VNR-118066	2019	VNR Seeds, Raipur	
	NDPK-24 (OPC)	-	NDUAT, Faizabad	
	HAPK-10 (OPC)	-	ICER,RC, Ranchi	

Seed quantity	: 100 g	Total Centres	: 16
Seed supply	: 30 <sup>th</sup> Oct. (16+3 pkt)	Design	: RBD
Plot size	: 3.2 X 3.0 m	Replication	: 4
Spacing	: 20 X 10 cm		

## 8. Bottle gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	NDBGH-8-19	2019	NDUA&T, Faizabad	<b>I:</b> Srinagar, Pithoragarh, Pantnagar <b>IV:</b> IIVR, Faizabad, Kalyanpur, Sabour, Ludhiana, Prayagraj (Allahabad) <b>V:</b> Bhubaneswar(OUAT), Raipur, Hyderabad <b>VI:</b> IARI, Durgapura, Hisar <b>VIII:</b> IIHR, Coimbatore, Vellanikkara
2.	NDBGH-16-27	2019	NDUA&T, Faizabad	
3.	VRBGH-3	2019	IIVR, Varanasi	
4.	VNR-67082	2019	VNR Seeds, Raipur	
5.	VNR-66015	2019	VNR Seeds, Raipur	
	Anurag (C)	-	Nuziveedu Seeds	
	NDBGH-10 (OPC)	-	NDUA&T, Faizabad	

Seed quantity	: 50 gm	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 30 × 75 cm		

### 9. Bitter gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	DBGH-163	2019	IARI, New Delhi	<b>I:</b> Srinagar, Pithoragarh, Pantnagar <b>IV:</b> IIVR, Sabour, Ludhiana, Kalyanpur, Prayagraj (Allahabad) <b>V:</b> Bhubaneswar (OUAT), Raipur, Hyderabad <b>VI:</b> IARI, Hisar, Junagadh, Durgapura <b>VIII:</b> IIHR, Vellanikkara
2.	DBGH-246	2019	IARI, New Delhi	
3.	VNR Amber	2019	VNR Seeds, Raipur	
4.	VNR Nandita	2019	VNR Seeds, Raipur	
5.	NBGH-1067	2019	Nirmal seeds, MH	
6.	NBGH-815	2019	Nirmal seeds, MH	
7.	VRBTGH-2	2019	IIVR, Varanasi	
	Sel-I (C)	-	IARI, New Delhi	
	NBIH-2009 (C)	-	Nuziveedu seeds	

Seed quantity	: 50 g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> Oct. (17+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

### 10. Sponge gourd hybrid-IET

Sl. No.	Entry	Year	Source	Centres
1.	VNR Anita	2019	VNR Seeds, Raipur	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Allahabad, Banda <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur <b>VI:</b> IARI, Junagadh, Anand, Durgapura, <b>VII:</b> Jabalpur, Rahuri, Parbhani <b>VIII:</b> Karikal, Vellanikkara
2.	VNR-87124	2019	VNR Seeds, Raipur	
3.	DSGH-38	2019	IARI, New Delhi	
4.	VRSGH-6	2019	IIVR, Varanasi	
	Kashi Rakshita (C)	-	IIVR, Varanasi	
	Kashi Shreya (OPC)	-	IIVR, Varanasi	

Seed quantity	: 50 g	Total Centres	: 18
Seed supply	: 30 <sup>th</sup> Oct. (18+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 4
Spacing	: 150 × 75 cm		

### 11. Ridge gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	DRGGH-12	2019	IARI, New Delhi	<b>IV:</b> Allahabad, IIVR, Sabour, Kalyanpur <b>V:</b> Hyderabad, Bhubaneswar (OUAT), Raipur <b>VI:</b> IARI, Junagadh, Bikaner (CIAH) <b>VIII:</b> IIHR, Coimbatore, Vellanikkara
2.	VNR-102	2019	VNR Seeds, Raipur	
3.	VNR-103	2019	VNR Seeds, Raipur	
4.	BNR-440	2019	Bharat Nursery	
5.	VRRGH-3	2019	IIVR, Varanasi	
6.	VRRGH-4	2019	IIVR, Varanasi	
	Pallavi (C)	-	Sungro Seed Company	

	Kashi Shivani (OPC)	-	IIVR, Varanasi	
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Seed quantity	: 50 gm	Total Centres	: 13
Seed supply	: 30 <sup>th</sup> Oct. (13+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

## **B. AVT-I-Hybrid Trials**

### **1. Brinjal Hybrid Long AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	SKUTBH-1	2018	SKUAST, Srinagar	<b>I:</b> Srinagar (SKUAST), Pantnagar, Pithoragarh <b>II:</b> Kalyani, Cooch Behar <b>III:</b> Barapani, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Hyderabad <b>VI:</b> IARI, Junagadh <b>VII:</b> Jabalpur, Parbhani, Goa <b>VIII:</b> Coimbatore, IIHR
2.	DBHL2110	2018	IARI, New Delhi	
3.	DBHL2100	2018	IARI, New Delhi	
4.	BNB-6424	2018	Bharat Nursery, Kolkata	
5.	IVBHL-22	2018	IIVR, Varanasi	
6.	Punjab Sadabahar (C)	-	PAU, Ludhiana	
7.	Naveena (C)	-	VNR, Seeds	
8.	ARBH-486(C)	-	Ankur Pvt Ltd	

Seed quantity	: 10g	Total Centres	: 20
Seed supply	: 30 <sup>th</sup> May (20+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 3
Spacing	: 75 × 60 cm		

### **2. Brinjal Hybrid Round AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	DBHR-25	2018	IARI, New Delhi	<b>I:</b> Srinagar (SKU), Pantnagar, Pithoragarh <b>II:</b> Kalyani, Cooch Behar <b>III:</b> Barapani, Portblair <b>IV:</b> Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur <b>V:</b> Raipur, Hyderabad <b>VI:</b> IARI, Junagadh <b>VII:</b> Jabalpur, Parbhani, Goa <b>VIII:</b> Coimbatore, IIHR
2.	DBHR-2340	2018	IARI, New Delhi	
3.	BNB-422	2018	Bharat Nursery, Kolkata	
4.	IVBHR-18	2018	IIVR, Varanasi	
5.	JBH-13-04	2018	JAU, Junagadh	
6.	JBH-14-10	2018	JAU, Junagadh	
7.	Pusa Hybrid-6 (C)	-	IARI, New Delhi	
8.	Kashi Sandesh (C)	-	IIVR, Varanasi	
9.	Swarn mani (C)	-	RCER(Ranchi)	

Seed quantity	: 10g	Total Centres	: 21
Seed supply	: 30 <sup>th</sup> May (21+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 3
Spacing	: 75 × 60 cm		

### 3. Chilli Hybrid/Hot Pepper AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	UARCH-42	2018	UAS Raichur	<b>I:</b> Srinagar (SKU), Pantnagar, Srinagar (CITH), Palampur, Pithoragarh <b>II:</b> Kalyani, Cooch Bihar <b>IV:</b> Ranchi, Ludhiana, IIVR <b>V:</b> Raipur, Bhubaneswar (OUAT), Lam <b>VI:</b> IARI, Hisar, Anand <b>VII:</b> Parbhani, Rahuri, Jabalpur, Goa <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS), UAS - Raichur
2.	UARCH-43	2018	UAS Raichur	
3.	CCH-10	2018	IIVR, Varanasi	
4.	TMPH-424	2018	Trimurti Seed	
5.	VNR-145	2018	VNR Seeds	
6.	VNR-305	2018	VNR Seeds	
7.	MH-3201	2018	Metahelix Seeds	
8.	BSS-453(C)	-	Bejo Sheetal Seeds	
9.	ARCH-228 (C)	-	Ankur Seeds	
10.	Kashi Anmol(C)	-	IIVR, Varanasi	

Seed quantity	: 50g	Total Centres	: 24
Seed supply	: 30 <sup>th</sup> May (24+3 pkt)	Design	: RBD
Plot size	: 4.2 × 3.5 m	Replication	: 3
Spacing	: 60 × 50 cm		

### 4. Okra Hybrid (YVMV) AVT-I

Sl. No.	Entries	Year	Source	Centres
1.	NOH-05	2018	Nath Biogenes	<b>I:</b> Jammu, Pantnagar <b>II:</b> Kalyani <b>IV:</b> IIVR, Ludhiana, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Lam <b>VI:</b> IARI, Hisar, Junagadh, Navsari <b>VII:</b> Rahuri, Jabalpur, Parbhani, Akola, Dapoli <b>VIII:</b> Coimbatore, IIHR, Bengaluru, Vellanikkara
2.	VROH-15	2018	IIVR, Varanasi	
3.	MO-203	2018	Metahelix Seeds	
4.	MO-205	2018	Metahelix Seeds	
5.	Kashi Kranti (C)	-	IIVR, Varanasi	
6.	Pusa Sawani (C)	-	IARI, New Delhi	
7.	Arka Anamika (C)	-	IIHR, Bengaluru	

Seed Quantity	: 100 g	Total centres	: 22
Seed supply	: 30 <sup>th</sup> May (22+3 pkt)	Design	: RBD
Plot size	: 3.0 × 2.7 m	Replications	: 3
Spacing	: 60 × 30 cm		

### 5. Bottle gourd Hybrid AVT-I

Sl. No.	Entries	Year	Source	Centres
1.	NDBGH-14-10	2018	NDUA&T, Faizabad	<b>I:</b> Srinagar (SKU), Pantnagar, Pithoragarh, Jammu <b>III:</b> Barapani, Portblair <b>IV:</b> Ranchi, Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad <b>V:</b> Bhubaneswar (OUAT), Hyderabad
2.	BRBGH-1-18	2018	BAU, Sabour	
3.	VRBGH-2-1	2018	IIVR, Varanasi	
4.	SARITA	2018	VNR Seeds	
5.	HARUNA	2018	VNR Seeds	

6.	Kashi Ganga (C)	-	IIVR, Varanasi	<b>VI:</b> IARI, Junagadh <b>VII:</b> Rahuri, Chitrakoot, Jabalpur, Parbhani <b>VIII:</b> Coimbatore, Bagalkot (UHS), IIHR, Vellanikara
7.	Arka Bahar (C)	-	IIHR, Bengluru	

Seed quantity	: 50 g	Total Centres	: 25
Seed supply	: 30 <sup>th</sup> Oct. (25+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 300 × 75 cm		

**6. Bitter gourd Hybrid AVT-I**

Sl. No.	Entries	Year	Source	Centres
1.	Pragati-065	2018	East West Seeds	<b>I :</b> Pantnagar, DIBER <b>III:</b> Nagaland, Barapani <b>IV:</b> IIVR, Ludhiana, Allahabad, Ranchi <b>V:</b> Bhubaneswar <b>VI:</b> IARI, Hisar, Rahuri, <b>VIII:</b> Coimbatore,
2.	HKH-56	2018	CCSHAU, Hisar	
3.	DBGH-11	2018	IARI, New Delhi	
4.	DBGH-26	2018	IARI, New Delhi	
5.	Akash	2018	VNR, Seeds	
6.	Sunny	2018	VNR, Seeds	
7.	Pusa Hybrid-2 (C)	-	IARI, New Delhi	
8.	NBGH-167(C)	-	Nirmal seeds	
9.	Vivek (C)	-	Sungro seeds	

Seed quantity	: 50 g	Total Centres	: 13
Seed supply	: 30 <sup>th</sup> Oct. (13+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

**7. Ridge gourd Hybrid AVT-I**

Sl. No.	Entries	Year	Source	Centres
1.	DRGH-8	2018	IARI, New Delhi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad <b>V:</b> Bhubaneswar (OUAT), Hyderabad <b>VI:</b> IARI, Junagadh, Anand, Durgapura, CIAH <b>VIII:</b> IIHR, Coimbatore, Karikal
2.	Aarti	2018	VNR Seeds	
3.	VRRGH-1	2018	IIVR, Varanasi	
4.	VRRGH-2	2018	IIVR, Varanasi	
5.	Kashi Shivani (C)	-	IIVR, Varanasi	
6.	Pusa Nasdaar (C)	-	IARI, New Delhi	
7.	Pusa Nutan (C)	-	IARI, New Delhi	

Seed quantity	: 50 g	Total Centres	: 16
Seed supply	: 30 <sup>th</sup> Oct. (16+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

**8. Sponge gourd hybrid AVT-I**

Sl. No.	Entry	Year	Source	Centres
1.	DSGH-95	2018	IARI, New Delhi	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad <b>V:</b> Bhubaneswar (OUAT),
2.	VRSGH-4	2018	IIVR, Varanasi	
3.	VRSGH-5	2018	IIVR, Varanasi	

Sl. No.	Entry	Year	Source	Centres
4.	Alok	2018	VNR Seeds	Hyderabad
5.	Kalyanpur Hari Chikani (C)	-	CSAUA&T, Kalyanpur	<b>VI:</b> IARI, Junagadh, Anand, Durgapura, CIAH <b>VIII:</b> Coimbatore, Karikal
6.	VRSGH-1(Kashi Rakshita) (C)	-	IIVR, Varanasi	
7.	VRSG-194 (Kashi Shreya) (C)	-	IIVR, Varanasi	

Seed quantity	: 50 g	Total Centres	: 15
Seed supply	: 30 <sup>th</sup> Oct. (15+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

### 9. Pumpkin Hybrid AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	PPH-1	2018	PAU, Ludhiana	<b>IV:</b> Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi <b>V:</b> Hyderabad, Bhubaneswar (OUAT) <b>VI:</b> IARI, Durgapura <b>VII:</b> Parbhani, Rahuri, Jabalpur, Akola, <b>VIII:</b> IIHR, Coimbatore, Karikal
2.	PPH-2	2018	PAU, Ludhiana	
3.	VRPKH-16-06	2018	IIVR, Varanasi	
4.	VNR-16-14	2018	VNR, Seeds	
5.	Kashi Harit OP( C)	-	IIVR, Varanasi	
6.	Pusa Viswash( C)	-	IARI, New Delhi	
7.	Narendra Abhushan ( C)	-	NDUAT, Faizabad	

Seed quantity	: 100 g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> Oct. (17+3 pkt)	Design	: RBD
Plot size	: 7.5 X 3.0 m	Replication	: 4
Spacing	: 300 X 60 cm		

### C. AVT-II Trials

#### 1. Brinjal Hybrid Long AVT-II

Sl. No.	Entry	Year	Source	Conducting centres
1.	IVBHL-21	2017	IIVR, Varanasi	<b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Faizabad, Ranchi <b>VI:</b> IARI, Junagadh, Durgapura <b>VII:</b> Jabalpur, Rahuri, Parbhani
2.	NDBH-14-7	2017	NDUA&T, Faizabad	
3.	PBHL-56	2017	PAU, Ludhiana	
4.	Barak	2017	Camson Seeds Ltd.	
5.	Punjab Sadabahar (OPC)	-	PAU, Ludhiana	
6.	Navina (C)	-	VNR Seeds	
7.	ARBH-786 (C)	-	Ankur Seeds	

Seed quantity	: 10g	Total Centres	: 12
Seed supply	: 30 <sup>th</sup> May (12+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 3
Spacing	: 75 × 60 cm		



**2. Brinjal Hybrid Round- AVT-II**

Sl. No.	Entry	Year	Source	Conducting centres
1.	IVBHR-17	2017	IIVR, Varanasi	<b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi <b>V:</b> Raipur <b>VI:</b> IARI, Junagadh, Hisar <b>VII:</b> Rahuri, Jabalpur, Parbhani
2.	DBHR-91	2017	IARI, New Delhi	
3.	DBHR-1011	2017	IARI, New Delhi	
4.	PBHR-44	2017	PAU, Ludhiana	
5.	Krishna	2017	Camson Seeds Ltd.	
6.	JBH-13-06	2017	JAU, Junagadh	
7.	JBH-14-01	2017	JAU, Junagadh	
8.	Pusa Hybrid-6 (C)	-	IARI, New Delhi	
9.	Kashi Sandesh (C)	-	IIVR, Varanasi	
10.	EPH-178(C)	-	Syngenta Seeds	
11.	Swarna Mani (black) OPC	-	RCER, Ranchi	

Seed quantity	: 10g	Total Centres	: 12
Seed supply	: 30 <sup>th</sup> May (12+3 pkt)	Design	: RBD
Plot size	: 4.5 × 3.0 m	Replication	: 3
Spacing	: 75 × 60 cm		

**3. Tomato Hybrid Determinate AVT-II**

Sl.No.	Entry	Year	Source	Conducting centres
1.	NBH- Benaka	2017	Noble Seeds	<b>I:</b> Pantnagar, Almora, Jammu, Srinagar (CITH), Pithoragarh <b>III:</b> Passighat, Nagaland, Portblair <b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi <b>VI:</b> IARI, Hisar, Durgapura, Junagadh <b>VII:</b> Rahuri, Jabalpur, Goa <b>VIII:</b> IIHR, Coimbatore
2.	TH-1214	2017	PAU, Ludhiana	
3.	Akashganga	2017	Camson Seeds Ltd.	
4.	Beas	2017	Camson Seeds Ltd.	
5.	BSS-488 (C)	-	Bejo Sheetal Seeds	
6.	Bhagya (C)	-	Nuziveedu Seeds	
7.	KashiAman (OPC)	-	IIVR, Varanasi	

Seed quantity	: 10g	Total Centres	: 22
Seed supply	: 30 <sup>th</sup> May (22+3 pkt)	Design	: RBD
Plot size	: 4.8 × 4.0 m	Replication	: 4
Spacing	: 60 × 50 cm		

**5. Chilli Hybrid/Hot Pepper AVT-II**

Sl. No.	Entry	Year	Source	Conducting centres
1.	NCH-3590	2017	Nirmal Seeds	<b>I:</b> Srinagar (SKU), Srinagar (CITH), Solan <b>IV:</b> IIVR, Ludhiana, Faizabad, Allahabad <b>V:</b> Lam, Raipur
2.	NBH-Sindoor (Byadagi)	2017	Noble Seeds	
3.	Arka Khyathi	2017	IIHR, Bangaluru	
4.	Arka Haritha	2017	IIHR, Bangaluru	
5.	Arka Sweta	2017	IIHR, Bangaluru	

Sl. No.	Entry	Year	Source	Conducting centres
6.	Pennar	2017	Camson Seeds Ltd.	<b>VI:</b> IARI, Hisar, Junagadh, Navsari
7.	Gomti	2017	Camson Seeds Ltd.	
8.	BSS-453 (C)	-	Bejo Sheetal	<b>VII:</b> Rahuri, Parbhani, Jabalpur <b>VIII:</b> Coimbatore, IIHR, Bagalkot (UHS)
9.	ARCH-228 (C)	-	Ankur	
10.	Kashi Anmol (OPC)	-	IIVR	

Seed quantity	: 10g	Total Centres	: 19
Seed supply	: 30 <sup>th</sup> May (16+3 pkt)	Design	: RBD
Plot size	: 4.2 × 3.5 m	Replication	: 3
Spacing	: 60 × 50 cm		

### 5. Okra Hybrid (YVMV) AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	OKMSH-3	2017	IIHR, Bangaluru	<b>IV:</b> IIVR, Sabour, Ludhiana, Ranchi, Faizabad, Kalyanpur
2.	DOH-2	2017	IARI, New Delhi	
3.	MYNA-24	2017	Nuziveedu seeds	<b>V:</b> Bhubaneshwar, Raipur, Lam
4.	VROH-11	2017	IIVR, Varanasi	
5.	Nandi	2017	Camson Seeds Ltd.	<b>VI:</b> IARI, Navsari, Durgapura, Junagadh
6.	Satlaj	2017	Camson Seeds Ltd.	
7.	Kashi Kranti (C)	-	IIVR, Varanasi	<b>VII:</b> Jabalpur, Rahuri, Akola, Parbhani <b>VIII:</b> IIHR, Coimbatore
8.	A. Anamika (C)	-	IIHR, Bangaluru	
9.	Pusa Sawani (C)	-	IARI, New Delhi	
10.	NBH-180 (C)	-	Nuziveedu Seeds	

Seed Quantity	: 100 g	Total centres	: 19
Seed supply	: 30 <sup>th</sup> May (19+3 pkt.)	Design	: RBD
Plot size	: 3.0 × 2.7 m	Replications	: 4
Spacing	: 60 × 30 cm		

### 6. Watermelon Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	NWMH-354	2017	Nirmal Seeds	<b>IV:</b> IIVR, Sabour, Ludhiana, Ranchi
2.	NBH- Krishna	2017	Noble Seeds	
3.	Rambo	2017	Nuziveedu Seeds	<b>VI:</b> IARI, Navsari, Durgapura, Junagadh
4.	New Netravati	2017	Camson Seeds Ltd.	
5.	Chandraprabhavati	2017	Camson Seeds Ltd.	<b>VII:</b> Jabalpur, Rahuri, Akola <b>VIII:</b> IIHR, Bagalkot (UHS), Coimbatore, Vellanikkara
6.	Arka Manik (C)	-	IIHR, Bangaluru	
7.	Arka Jyoti (C)	-	IIHR, Bangaluru	
8.	Sugar Baby (C)	-	IARI, New Delhi	

Seed quantity : 50 g  
 Seed supply : 30<sup>th</sup> Oct. (10+3 pkt)  
 Plot size : 7.5 × 3.0 m  
 Spacing : 150 × 75 cm

Total Centres : 15  
 Design : RBD  
 Replication : 3

### 7. Muskmelon Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	DMH-5	2017	IARI, New Delhi	<b>IV:</b> IIVR, Sabour, Ludhiana, Ranchi <b>VI:</b> IARI, Navsari, Durgapura, Hisar <b>VII:</b> Jabalpur, Rahuri, Akola <b>VIII:</b> IIHR, Coimbatore
2.	DMH-11	2017	IARI, New Delhi	
3.	NMMH-24	2017	Nirmal Seeds	
4.	MH-27	2017	PAU, Ludhiana	
5.	Punjab Hybrid (C)	-	PAU, Ludhiana	
6.	Kashi Madhu (C)	-	IIVR, Varanasi	

Seed quantity : 50 g  
 Seed supply : 30<sup>th</sup> Oct. (10+3 pkt)  
 Plot size : 7.5 × 3.0 m  
 Spacing : 150 × 75 cm

Total Centres : 13  
 Design : RBD  
 Replication : 4

### 8. Bottle gourd Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Bandhu	2017	Noble Seeds	<b>I:</b> Srinagar, Pithoragarh <b>IV:</b> IIVR, Faizabad, Kalyanpur, Sabour, Ludhiana <b>VI:</b> IARI, Navsari <b>VIII:</b> IIHR
2.	BRBGH-1	2017	BAU, Sabour	
3.	BRBGH-2	2017	BAU, Sabour	
4.	VRBGH-2	2017	IIVR, Varanasi	
5.	Brahmaputra	2017	Camson Seeds Ltd.	
6.	Narendra Kamna	2017	NDUA&T, Faizabad	
7.	NDBGH-4 (C)	-	NDUA&T, Faizabad	
8.	Santosh (C)	-	Krishdhan Seeds	
9.	Kashi Ganga (C)	-	IIVR, Varanasi	

Seed quantity : 50 g  
 Seed supply : 30<sup>th</sup> Oct. (10+3 pkt)  
 Plot size : 7.5 × 3.0 m  
 Spacing : 300 × 75 cm

Total Centres : 10  
 Design : RBD  
 Replication : 3

### 9. Bitter gourd Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Archana	2017	Noble Seeds	<b>I:</b> Srinagar, Pithoragarh <b>IV:</b> IIVR, Sabour, Ludhiana, Faizabad, Kalyanpur <b>VI:</b> IARI, Navsari <b>VIII:</b> IIHR
2.	NHBI- 2595	2017	Nuziveedu Seeds	
3.	Lohit	2017	Camson Seeds Ltd.	
4.	Tunga	2017	Camson Seeds Ltd.	
5.	DBGH 21	2017	IARI, New Delhi	
6.	DBGH-542	2017	IARI, New Delhi	

7.	Pusa Hybrid-2 (C)	-	IARI, New Delhi
8.	NBGH-167 (C)	-	Nirmal Seeds
9.	Vivek (C)	-	Sungro Seeds

Seed quantity	: 50 g	Total Centres	: 10
Seed supply	: 30 <sup>th</sup> Oct. (10+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

## 10. Ridge gourd Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Raveena	2017	Noble Seeds	<b>I:</b> Srinagar, Pithoragarh
2.	DRGH-4	2017	IARI, New Delhi	<b>IV:</b> Allahabad, IIVR, Sabour,
3.	Arka Vikram	2017	IIHR, Bangaluru	Ludhiana, Faizabad, Kalyanpur
4.	Kauveri	2017	Camson Seeds Ltd.	<b>V:</b> Hyderabad
5.	Pusa Nasdar (C)		IARI, New Delhi	<b>VI:</b> IARI, Navsari, Junagadh
6.	Pusa Nutan (C)	-	IARI, New Delhi	<b>VIII:</b> IIHR, Coimbatore

Seed quantity	: 50 g	Total Centres	: 14
Seed supply	: 30 <sup>th</sup> Oct. (14+3 pkt)	Design	: RBD
Plot size	: 7.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 75 cm		

### 11. Cucumber Hybrid AVT-II

Sl. No	Entries	Year	Source	Conducting centres
1.	DGCH-56	2017	IARI, New Delhi	<b>I:</b> Pantnagar, Srinagar (SKU), Solan, Palampur
2.	NCUH-1176	2017	Nuziveedu Seeds	
3.	Meghana	2017	Camson Seeds Ltd.	<b>IV:</b> IIVR, Sabour, Ranchi, Ludhiana
4.	VRCUH-1	IIVR	IIVR, Varanasi	<b>VI:</b> IARI, Durgapura, Junagadh
5.	Hybrid No.1 (C)	-	Century Seeds	<b>VII:</b> Rahuri, Parbhani, Jabalpur
6.	PCUCH-3(C)	-	GBPUA&T, Pantnagar	<b>VIII:</b> IIHR, Vellanikkara, Coimbatore

Seed quantity	: 25 g	Total Centres	: 17
Seed supply	: 30 <sup>th</sup> Oct. (17+3 pkt)	Design	: RBD
Plot size:	4.5 × 3.0 m	Replication	: 3
Spacing	: 150 × 50 cm		

## **SESSION- V**

### **Evaluation for biotic and abiotic stresses**

Chairperson	: Dr. K.V. Peter, Former Vice chancellor, KAU, Vellanikkara
Co-Chairperson	: Dr. A.S. Dhatt, Head, Div. of Veg. Crops, PAU, Ludhiana
Convener	: Dr. R.K. Dubey, Sr. Scientist, ICAR-IIVR, Varanasi
Rapporteurs	: Dr. Arup Chattopadhyaya, Prof., BCKV, Kalyani
	: Dr. Indivar Prasad, Scientist, ICAR-IIVR, Varanasi

Chairperson in his opening remarks highlighted the significance of biotic and abiotic stresses in vegetable production. He said that we have initiated trials on biotic stresses however he emphasized that the programmes on abiotic stresses on different vegetables should also be initiated. Co-Chairperson also highlighted the importance of biotic stress trials in moving towards the concept of “clean vegetable” production. The outcome and data of different trials related to disease resistant trials for the years 2017-18 and 2018-19 were reviewed and presented by Dr. T.K. Behera, Principal Scientist, ICAR-IARI, New Delhi. During reporting period all the trials were reported (100%), however some trials of 2018-19 are still in progress.

#### **Following suggestions and views emerged during the discussion:**

- All the centres should strictly follow the instructions and methodology adopted by PC cell for conducting trials and data recording under biotic stresses.
- It was also suggested to take utmost care in data analysis and verify the discrepancies before reporting.
- Biotic trials should be conducted at identified hot spot of the respective diseases.
- Correct methodology has to be followed for PDI calculation and transformed value should be reported for statistical analysis.
- While visiting centres for monitoring, visiting scientists should critically evaluate trials conduction and data recording procedure.

In the concluding remarks, the Chairperson stressed upon the importance of using scientific methodology in trial conduction and subsequent data analysis/ reporting.

#### **Recommendations:**

- Trials on bacterial wilt of important Cole crops and Solanaceous crops should be initiated.
- Trials should be formulated on high temperature tolerance in tomato and powdery mildew resistance in pea.
- Programs on abiotic stresses (salt tolerance/ moisture deficit conditions) on major vegetables should be initiated as it is presently missing in technical programme. Centers should contribute entries in adequate numbers for conduct of these trials.

### TECHNICAL PROGRAMME (2019-20)

#### **A. IET Trials:**

##### **1. Peas (Mid-Season) Powdery Mildew IET**

Sl. No.	Entries	Year	Source	Centres
1.	Arka Pramod	2019	IIHR, Bengaluru	<b>I:</b> Solan, Almora, Pantnagar, Pithoragarh, Ranichauri, Palampur <b>III:</b> Nagaland, Passighat, Portblair <b>IV:</b> IIVR, Ludhiana, Kalyanpur <b>V:</b> Bhubaneswar (OUAT), Hyderabad, Raipur <b>VI:</b> IARI, Hisar, Durgapura <b>VIII:</b> IIHR, Bagalkot (UHS)
2.	Arka Uttam	2019	IIHR, Bengaluru	
3.	APL 5-55	2019	CSKHPKV, Palampur	
4.	GP-1505 (GP 912-1-3)	2019	IARI, New Delhi	
5.	VRP 343	2019	IIVR, Varanasi	
	(Kashi Samridhi (VRPMR-11) (C)	-	IIVR, Varanasi	
	Arka Priya (IIHR-1) (C)	-	IIHR, Bengaluru	

Seed Quantity	: 300 g	Total centres	: 20
Seed supply	: 30 <sup>th</sup> Sept. (20+3 pkt)	Design	: RBD
Plot size	: 3.0 × 3.0 m,	Replications	: 3
Spacing	: 30 × 10 cm		

##### **2. Tomato (ToLCV) Hybrid IET**

Sl. No.	Entries	Year	Source	Centres
1.	Pusa ToLCV Hybrid-8	2019	IARI, New Delhi	<b>III:</b> Passighat, Portblair, Barapani <b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur <b>V:</b> Raipur, Hyderabad, Bhubneshwar (OUAT) <b>VI:</b> IARI, Hisar, Durgapura, Junagadh <b>VII:</b> Rauri, Jabalpur, Goa <b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)
2.	Pusa ToLCV Hybrid-9	2019	IARI, New Delhi	
3.	Arka Abhed	2019	IIHR, Bengaluru	
4.	CRPVTRH-16-3	2019	IIVR, Varanasi	
5.	CRPVTRH-16-5	2019	IIVR, Varanasi	
	Kashi Vishesh (H-86) (C)	-	IIVR, Varanasi	
	Kashi Aman (C)	-	IIVR, Varanasi	
	Punjab Chhuhara (SC)	-	PAU, Ludhiana	

Seed Quantity	: 10 g	Total centres	: 20
Seed supply	: 30 <sup>th</sup> May (20+3)	Design	: RBD
Plot size	: 4.8 x 4.0 m	Replications	: 3
Spacing	: 60 x 50 cm		

##### **3. Tomato (ToLCV) Varietal IET**

Sl. No.	Entries	Year	Source	Centres
1.	BT-19-1-101	2019	Bhubneshwar (OUAT)	<b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Faizabad <b>V:</b> Bhubneshwar (OUAT), Raipur,
2.	PAULCVR-5	2019	PAU, Ludhiana	
3.	PAULCVR-6	2019	PAU, Ludhiana	

Sl. No.	Entries	Year	Source	Centres
4.	VRT-16-0118	2019	IIVR, Varanasi	Hyderabad
5.	NDT Sel-1	2019	NDUAT-Faizabad	<b>VI:</b> IARI, Hisar, Durgapura, Junagadh
	Kashi Vishesh (H-86)	2019	IIVR, Varanasi	<b>VII:</b> Rahuri, Jabalpur, Goa
	Kashi Aman (C)	-	IIVR, Varanasi	<b>VIII:</b> IIHR, Coimbatore
	Punjab Chhuhara (SC)	-	PAU, Ludhiana	

Seed Quantity	:	10 g	Total centres	:	17
Seed supply	:	30 <sup>th</sup> May (17+3 pkt)	Design	:	RBD
Plot size	:	4.8 x 4.0 m	Replications	:	3
Spacing	:	60 x 50 cm			

#### 4. Okra (YVMV) Varietal IET

Sl. No.	Entries	Year	Source	Centres
1	BRO-2	2019	BAU, Sabour	<b>IV:</b> IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi <b>V:</b> Bhubneshwar (OUAT), Raipur, Hyderabad <b>VI:</b> IARI, Hisar, Durgapura, Junagadh, Anand <b>VII:</b> Rahuri, Jabalpur, Goa <b>VIII:</b> IIHR, Coimbatore
2	JOL-16-06	2019	JAU, Junagadh	
3	JOL-13-05	2019	JAU, Junagadh	
4	VRO-114	2019	IIVR, Varanasi	
5	VRO-126	2019	IIVR, Varanasi	
6	HB-13-11-3	2019	HAU, Hisar	
7	DOV-9	2019	IARI, New Delhi	
8	AOL-16-01	2019	AAU, Anand	
9	AOL-18-08	2019	AAU, Anand	
	Kashi Kranti (C)	-	IIVR, Varanasi	
	AOL-12-52 (C)	-	AAU, Anand	
	Pusa Sawani (SC)	-	IARI, New Delhi	

Seed Quantity	:	100g	Total centres	:	18
Seed supply	:	30 <sup>th</sup> May (18+3 pkt)	Design	:	RBD
Plot size	:	3.00 x 2.70 m	Replications	:	3
Spacing	:	60 x 30 cm			

### **B. AVT-I trials:**

#### 1. Okra (YVMV) AVT-I

S. No.	Entries	Year	Source	Centres
1.	BCO-4	2018	BCKV, Kalyani	<b>I:</b> Jammu, Pantnagar <b>II:</b> Kalyani, Jorhat <b>IV:</b> IIVR, Ludhiana, Faizabad, Kalyanpur <b>V:</b> Bhubaneshwar, Raipur, Hyderabad, Lam <b>VI:</b> IARI, Hisar, Junagadh, Anand, Navsari <b>VII:</b> Rahuri, Jabalpur, Parbhani, Akola, Dapoli
2.	AKOV-118	2018	PDKV, Akola	
3.	VRO-110	2018	IIVR, Varanasi	
4.	VRO-119	2018	IIVR, Varanasi	
5.	JOL-14-10	2018	JAU, Junagadh	
6.	Pusa sawani (C)	-	IARI, New Delhi	

Arka Anamika (C)	-	IIHR, Bengaluru	<b>VIII:</b> Coimbatore, IIHR, Vellanikara
Kashi Kranti (C)	-	IIVR, Varanasi	

Seed Quantity	: 100 g	Total centres	: 25
Seed supply	: 30 <sup>th</sup> May(25+3 pkt)	Design	: RBD
Plot size	: 3.0 x 2.7 m	Replications	: 3
Spacing	: 60 x 30 cm		

## 2. Tomato (ToLCV) AVT-I

Sl. No.	Entries	Year	Source	Centres
1.	IIHR -391	2018	IIHR, Bengaluru	<b>II:</b> Kalyani
2.	IIHR -385	2018	IIHR, Bengaluru	
3.	VRT-28	2018	IIVR, Varanasi	<b>IV:</b> IIVR, Ludhiana, Ranchi, RAU Pusa
4.	Pusa ToLCV Hyb-3	2018	IARI, New Delhi	
5.	Pusa ToLCV Hyb-6	2018	IARI, New Delhi	<b>V:</b> Raipur, Hyderabad, Bhubaneswar (OUAT)
	Kashi Aman (C)	-	IIVR, Varanasi	
	Punjab Chhuara (C)	-	PAU, Ludhiana	<b>VI:</b> IARI, Junagadh, Hisar
				<b>VIII:</b> IIHR, Coimbatore, Bagalkot (UHS)

Seed Quantity	: 10 g	Total centres	: 14
Seed supply	: 30th May(14+3 pkt)	Design	: RBD
Plot size	: 4.8 x 4.0 m	Replications	: 3
Spacing	: 60 x 50 cm		

## C. AVT-II Trials

### 1. Okra (YVMV) AVT-II

S. No.	Entries	Year	Source	Centres
1.	BRO-01	2017	BAU, Sabour	<b>I:</b> Pantnagar, Palampur, Jammu
2.	VRO-111	2017	IIVR, Varanasi	
3.	GK-4	2017	MPKV, Rahuri	<b>II:</b> Kalyani
4.	Punjab Suhawani	2017	PAU, Ludhiana	
5.	Palam Komal	2017	CSK HPKV, Palampur	<b>IV:</b> IIVR, Ludhiana, Faizabad, Kalyanpur, Sabour
6.	AKOV-117	2017	PDKV, Akola	
7.	Pusa Sawani (SC)	-	IARI, New Delhi	<b>V:</b> Bhubaneswar, Raipur, Hyderabad, Lam
8.	A. Anamika (C)	-	IIHR, Bangaluru	
9.	Kashi Kranti (C)	-	IIVR, Varanasi	<b>VI:</b> IARI, Hisar, Junagadh, Anand, Navsari
				<b>VII:</b> Rahuri, Jabalpur, Parbhani, Akola, Dapoli
				<b>VIII:</b> Coimbatore, IIHR, Vellanikkara

Seed Quantity	: 100 g	Total centres	: 26
Seed supply	: 30 <sup>th</sup> May (26+3 pkt.)	Design	: RBD
Plot size	: 3.0 x 2.7 m	Replications	: 4
Spacing	: 60 x 30 cm		



## SESSION- VI

### Vegetable Production

Chairman	:	Dr. Kirti Singh, Ex. Chairman, ASRB, New Delhi
Co-Chairman	:	Dr. V. S. Yadav, Dean, RARI, Durgapura,
Convener	:	Dr. R.N.Prasad, Pr. Scientist, ICAR- IIVR, Varanasi
Rapporteurs	:	Dr. S. K.Singh, Pr. Scientist, ICAR- IIVR, Varanasi
	:	Dr. Anant Bahadur, Pr. Scientist, ICAR- IIVR, Varanasi

Chairman in his opening remarks emphasized the importance of production technologies for enhancing the input use efficiency, production of safe vegetables and enhancing vegetable production. Co-chairman emphasized use of herbicides for the management of weeds. He also suggested to include some more experiments on split application of organic manures in organic farming. Thereafter he invited the following scientists for presenting the results of the trials being conducted on Crop Production:

1. Dr. V Kanthaswamy - IPNM and Micronutrient Trials
2. Dr. S. K. Singh- Organic Farming, Weed Management Trials
3. Dr. Anant Bahadur – Drip Irrigation and Grafting Trials.

The presentations were followed by discussions and then a committee was constituted by the Chairman to finalize the recommendation from the results presented for the year 2017-18 and 2018-19 and also to formulate the technical programme for the year 2019-20.

- |    |                        |   |          |
|----|------------------------|---|----------|
| 1. | Dr. V. Kanthaswamy     | - | Chairman |
| 2. | Dr. R. N. Prasad       | - | Convener |
| 3. | Dr. S. N. S. Chaurasia | - | Member   |
| 4. | Dr. S. K. Singh        | - | Member   |
| 5. | Dr. Anant Bahadur      | - | Member   |
| 6. | Dr. H.S. Hebbar        | - | Member   |
| 7. | Dr. Kulbir Singh       | - | Member   |

#### Following points were suggested for improvement of the programme:

1. The name of the variety, sowing and harvesting time should also be mentioned in the result.
2. In spite of repeated recommendations in the group meeting, many of the centers have not given the economics /Benefit: Cost ratio of the treatments. This should be strictly adhered in all the production trials.
3. There is a need to establish critical stages/ period of weed control in vegetable crops to reduce the cost on weed management.
4. The name of Hisar centre may be dropped from the trial on INM studies in French Bean( VEG: 5.42) as the crop growth is poor at this place.
5. The micro nutrient content of commercial formulation of multiplex may also be mentioned in the experimental details.

6. The quantification of the fertilizer and FYM dose may be mentioned while formulating the recommendation.

## RECOMMENDATIONS

### 2017-18

- a. The three year study at **Bhubaneswar** centre on Integrated nutrient management in cucumber revealed that the maximum fruit yield of 142.17 q/ha was recorded with application of half recommended dose of NPK + FYM @ 10t/ha + Vermicompost @ 2t/ha + Biofertilizer with B:C ratio 2.33 .
- b. From the three year study at **Bhubaneswar** centre on **INM in broccoli** it may be concluded that the application of (Vermicompost @2.5t/ha+1/2 of the recommended dose of NPK through fertilizer gave maximum curd yield (**164.56 q/ha**) with maximum B:C ratio **1:3.16**.
- c. Experiment conducted at **IIVR** Varanasi revealed that maximum fruit yields of Okra 108.69 and 103.43 q/ha were recorded when drip irrigation was scheduled daily or alternate day with 100% PE coupled with black-silver mulching with B:C ratio of 1.72 and 1.68, respectively.
- d. At **Kalyanpur**, integrated nutrient management package for French bean cv. Azad Rajmah-1 with the application of 75% NPK through inorganic source + 25% N through vermicompost was found suitable for realizing optimum green pod yield (77.08 q/ha) and highest B:C ratio (2.67). Hence, it is recommended for agro-climatic condition of Zone- IV.

### 2018-19

- a. Three years study at Bhubaneswar on production in coriander radish sequence revealed that recommended FYM @20t/ha + fertilizer@80:60:80 NPK kg/ha +PP chemicals +IIHR microbial consortium @ 12.5 kg/ha gave highest yield in radish- coriander sequence with a B: C ratio of 3.46.
- b. A three year study on weed management in okra at IIHR Bangalore and Bhubaneswar revealed that, Pre-emergence application of pendimethalin @ 6 ml/L + one hand weeding 30 days after sowing was found suitable for maximum fruit yield of 85.5 q/ha with the BC ratio of 1.51 and 122.46q/ha with B:C ratio of 1.49 at IIHR Bangalore and Bhubaneswar respectively, and hence can be recommended for weed management in okra in this Agro climatic region.
- c. At **IIHR**, grafting study revealed that maximum and significantly highest fruit yield (740.8 q/ha was observed when M-9 hybrid brinjal grafted on wild *S. torvum* root stock with the no bacterial wilt incidence in all the 3 years with the Highest B:C ratio of 3.11
- d. Grafting study in brinjal at **IIVR** revealed that grafting of hybrid brinjal (Kashi Sandesh) on vigorous rootstocks, IC 354557 and IC 111056 though enhanced yield by 10-20% over non grafted plant, however, it was not economical for cultivation of brinjal.
- e. In the sub humid laterite soils of Kerala, for growing okra in summer season, drip irrigation on alternate days at 60%PE along with laying of black –silver polyethylene mulch, can be recommended for obtaining more plant height (3.0cm), lower number of days to flowering (32.5 days), more fruit length (20.4 cm), fruit girth(12.8cm), early maturity (77.6 days) consequently high yield (208.2q/ha) and a high cost benefit ratio of 2.1.

**TECHNICAL PROGRAMME (2019-20)**

<b>Integrated Nutrient Management (INM) studies</b>				
1.	INM in cucumber	5.15.14	Junagadh, Jorhat	2
2.	INM in bitter gourd	5.15.16	Vellanikara,	1
3.	INM in broccoli	5.15.18	Nagaland	1
4.	INM studies in French bean(2017-18)	5.42	Almora, Bhubneshwar - OUAT, Hyderabad, IIVR, Jabalpur, Jorhat (2018-19), Nagaland, Raipur, RPCAU-Pusa Samastipur(2019-20), Solan, Srinagar –SKUAST	12
<b>Micronutrient studies</b>				
5.	Response of tomato to foliar application of micronutrients	5.18.1	NHRDF	1
6.	Response of bitter gourd to foliar application of micronutrients	5.18.4	Bagalkot-Dharwad(2018-19),Kalayanpur Raipur, Hyderabad	4
<b>Organic trials</b>				
7.	Organic farming in okra, tomato and cowpea	5.26	Jorhat	1
8.	Organic production of amaranthus	5.26.1	(2018-19), Bagalkot-Dharwad, Karaikal, (2019-20) Coimbatore, Jorhat ,Nagaland, Vellanikkara	6
9.	Organic production of spinach beet	5.26.2	Kalyanpur, Srinagar, Nagaland, RPCAU Pusa(2019-20)	4
10.	Organic farming in coriander – radish sequence	5.26.3	Durgapura IIVR, Karaikal, Nagaland	4
<b>Drip irrigation studies</b>				
11.	Enhancing water productivity by drip irrigation and mulching in vegetables	5.32	Chitrakoot , Ludhiana (2018-19)	2
<b>Weed management studies</b>				
12.	Weed control in cowpea during kharif season	5.35	IIVR, Jorhat, Kalyanpur, Ludhiana, Pasighat, Raipur, Hisar (2018-19)	7
13.	Weed management in okra	5.40	Bagalkot-Dharwad, Hyderabad IIVR, Jorhat, Nagaland, Srinagar-SKUAST, Vellanikkara, Hisar (2018-19)	8
<b>Grafting trials</b>				
14.	Grafting studies in brinjal for the management of soil borne diseases and nematode	5.41	Bagalkot-Dharwad, Coimbatore, Cooch Bihar, Jorhat, Ludhiana, Raipur, Vellanikara	7
<b>New trial</b>				
15.	Effect of different dates of planting on growth and yield of Cowpea, tomato and okra in view of climate change.	5.43	Bagalkot-Dharwad, Bhubaneswar - OUAT, Coimbatore, Durgapura, Hisar, IIVR, Jorhat, Jabalpur, Kalayani, Kalyanpur, Ludhiana, RPCAU- Pusa, NHRDF	13
<b>Total</b>				<b>73</b>

For New Trial 5.43: - Detail given below

For other trials: - Please see the old proceedings.

**NEW TRIAL PROPOSED: 2019-20**

**5.43.Studies on the shift of planting dates in view of the rising temperature and correlation of yield with temperature of cowpea, tomato and okra.**

**Treatment details:**

Five Dates of sowing/planting

D<sub>1</sub>= 15 days before recommended date of sowing

D<sub>2</sub>= 30 days before recommended date of sowing

D<sub>3</sub>= recommended date of sowing

D<sub>4</sub>= 15 days after recommended date of sowing

D<sub>5</sub>= 30 days after recommended date of sowing

**Varieties:** Three most popular/leading varieties of the region (V1, V2, V3)

**Design:** Factorial Randomized Block Design

**Replication:** Three

Other package of practices as per the recommendation of the region.

**Observation to be recorded:**

1. Plant stand in %
2. Plant height (cm)
3. Number of fruits per plant
4. Average fruit weight (g)
5. Fruit yield per plant (kg)
6. Fruit yield per ha (q/ha)
7. Type of weeds and weed density at 45 days after planting
8. Weather parameter (Daily maximum and minimum temperature, rainfall, RH and sunshine hours)

**CENTRES ALLOTTED:**

IIVR, PAU, HAU, Durgapura, Kalyanpur, Jorhat, Bhubaneswar, Dharwad, TNAU, Jabalpur, RPCAU Pusa, Kalayani, NHRDF

**Detail observations:**

**5.43.Studies on the shift of planting dates in view of the rising temperature and correlation of yield with temperature of cowpea, tomato and okra.**

Location	:		Year	:	
Design	:		Replication	:	
Gross plot size (m <sup>2</sup> )	:		Net plot size (m <sup>2</sup> )	:	
Recommended dose of N: P: K (kg/ha)	:		Spacing (cm)	:	
Date of planting	:	D1:		D2:	
		D4:		D5:	
Date of harvest	:	D1:		D2:	
		D4:		D5:	
Variety Planted	:	V1:		V2:	
				V3:	

**Initial soil fertility status of the experimental plot**

Treatments	OC*	pH	Av N	Av P	Av K

**1. Plant stand / Plant emergence (%) at 30 days after planting**

Treatment	REP.I	REP.II	REP.III	Total	Average
D1V1					
D1V2					
D1V3					
D2V1					
D2V2					
D2V3					
D3V1					
D3V2					
D3V3					
D4V1					
D4V2					
D4V3					
D5V1					
D5V2					
D5V3					

Likewise above observational chart for Plant stand / Plant emergence (%) at 30 days after planting other characters viz., Plant height (cm) per plant at 35 days after planting, Number of fruits per plant, Number of picking/harvesting , Average fruit weight (g), Fruit yield per plant (kg), Total Fruit yield (Kg per plot) were also taken care. For other character please see the table as follows:

**1. Type of weeds and weed density at 45 days after planting**

	REP.I		REP.II		REP.III		Total		Average	
Treatment	monocot	dicot	monocot	dicot	monocot	dicot	monocot	dicot	monocot	dicot
D1V1										
D1V2 ... D5V3										

**2. Economics and net returns of different treatments**

Treatments	Yield (t/ha)	Cost of cultivation (H/ha)			Cost (Rs/ha)		Sale price (Rs/t)	Net returns* (Rs/ha)
		Seed	Fertilizer	Cultivation	Inputs	Produce		
D1V1								
D1V2 ... D5V3								

**3. Metrological data (recorded daily during crop season**

Date	Temperature <sup>0</sup> C		Relative Humidity (%)		Sunshine (hrs)	Soil Temperature <sup>0</sup> C	
	Min.	Max.	Min.	Max.		Min.	Max.

**SESSION –VII****Disease Management**

Chairperson	:	Dr. A.S. Krishnamurthy, TNAU, Coimbatore
Co-Chairperson	:	Dr. M.K. Reddy, ICAR-IIHR, Bengaluru Dr. T. Raguchander, Dean (DSW), TNAU, Coimbatore
Convener	:	Dr. A.N. Tripathi, Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. Abhishek Sharma, PAU, Ludhiana Dr. K. Nagendran, Scientist, ICAR-IIVR, Varanasi

Chairman formally welcomed the participants and briefed about the importance of diseases of vegetable crops and technical programme of the year 2018-19 on disease management. Eleven trials were allotted to 21 centers and all the centers submitted their reports.

Sl. No.	Name of the Presenter	Crop/Trials
1	Dr. Sandeep Kansal, YSPUHF Solan,	<ul style="list-style-type: none"> <li>• Veg.8.22 IDM package for cucurbit diseases</li> <li>• Veg.8.23 Bio-intensive management of diseases of capsicum under poly house.</li> </ul>
2	Dr. Abhishek Sharma, PAU, Ludhiana	<ul style="list-style-type: none"> <li>• Veg. 8.25 Assessment in yield losses due to major diseases in vegetable crops</li> <li>• Veg.8.28 Integrated management of bitter melon virus diseases (2018)</li> </ul>
3	Sandeep Kumar G.M, IIHR, Bengaluru	<ul style="list-style-type: none"> <li>• Veg.8.20 IDM package for tomato diseases</li> <li>• Veg.8.24 Monitoring emerging diseases of vegetable crops</li> <li>• Veg.8.26 IDM for bacterial wilt management of tomato</li> <li>• Veg.8.27 Identification of causal agent involved in stem splitting and gummy stem blight in cucurbit crops</li> </ul>

**During presentation of different trials following suggestions emerged:**

- For molecular characterization (based on ITS and tubulin genes) and diversity analysis, all the isolates of *Sclerotium rolfsii* collected from Varanasi, Hyderabad, and Raipur (except Junagadh) must be submitted to ICAR-IIHR indicated before October, 2019.
- Emergence of new race/strain variation in the pathogens may also be recorded under the Veg. 8.24 Monitoring emerging diseases of vegetable crops. Further changes in the aerobiology of the pathogen load under changing climatic scenario to be recorded.
- In Veg. 8.25 Assessment in yield losses due to major diseases in vegetable crops while assessing the yield loss, varieties may be selected uniformly across the centres.
- New nomenclature for bioagents needs to be used while presenting

- Terminology of bio pesticide may be replaced with bio regulator and the same may be informed to CIBRC through ICAR for their registration.
- Endophytes may be exploited for the management of vegetable diseases. Also diversified bioagents other than *Bacillus*, *Trichoderma* and *Pseudomonas* should also be exploited in disease management program.
- Koch's postulate should be proved before reporting the causal agent of the new disease.

### Recommendations:

The following recommendations were made from the experimental results of the different AICRP trials:

#### **Recommendations of Disease Management session of AICRP (VC) 2018-19**

**Under the Disease Management**, during 2018-19, a total of 123 trials were allotted among 21 coordinating centres. Out of 123 trials 78 were reported and 45 trials are in-progress. During the year 2017-18, a total of 93 trials were allotted among 20 coordinating centres. Out of 93 trials all 93 were conducted and reported.

#### **Veg 8.18. Nursery disease management using bio-agents and new fungicides**

At Varanasi, application of talc based formulations of *Bacillus subtilis* (BS2-IIVR strain) having minimum cfu of  $2.5 \times 10^8$  as seed treatment @ 4g/kg seed, soil application as 10g/m<sup>2</sup> and soil drenching @ 5%, has recorded reduced damping off incidence on tomato var. Kashi Aman (15.22%) and brinjal var. Kashi Taru (33.18%) with maximum cost benefit ratio (CBR) 1: 79.98 and 1: 36.69, respectively with improved germination percentage over control. In case of chilli var. Kashi Anmol, use of carbendazim (12%) + mancozeb (63%) (T-6) has recorded lowest incidence of damping off (13.30%) with cost benefit ratio (CBR) 1: 90.79. In addition it has improved germination percentage (86.58) and vigour index (479.52) of chilli seedlings.

#### **Veg 8.19. Integrated management of vector borne virus diseases of chilli**

At Lam, Bhubaneswar, Hessarghatta, Parbhani and Coimbatore, treatment integrated management include application of neem cake @ 1.0kg/sq.mt in the seed bed, spraying of Cyazpyr @ 1.8ml/liter (T5) 2-3 three days before transplanting, seed treatment with imidacloprid @ 8gm/kg, seedling dip of imidacloprid @ 0.5ml/L and growing of two rows of maize/sorghum (jowar) as border crop in the main field along with sliver agrimulch sheet + rotational spray of insecticides (Acephate @ 1.5 g/L + Neem Oil @ 2.0ml/L) + (Fipronil @ 1.0 ml/L + Neem Oil @ 2.0ml/L) + (Imidacloprid @ 2 g/15L + Neem oil @ 2.0ml/L) + (Cyazpyr @ 1.8ml/L) at 7 days interval till fruit formation have significantly reduced the incidence of vector borne viral diseases in chilli. Residual analysis of pesticides used in the best treatment has indicated that the acephate @ 1.5g/L, fipronil @ 1.0 ml/L imidacloprid @ 2g/15L and cyazpyr @ 1.8 ml per liter were not detected in HPLC/GLC testing. The CB ratio varied from 1:3.07 to 1:1.92. Therefore, this treatment has been recommended for management of vector borne virus diseases of chilli at Lam (cv. LCA 620), Bhubaneswar (cv. Utkal AVA), Hessarghatta (cv. Arka Kyathi), Parbhani (cv. Pusa Jwala) and Coimbatore (hy. Chilli CO1).

However at Ludhiana, in treatment comprising of application of neem cake @ 1.0kg/sq.mt in the seed bed, spraying of Cyazpyr @ 1.8ml/liter 2-3 three days before transplanting, seed treatment with imidacloprid @ 8gm/kg, seedling dip of imidacloprid @ 0.5ml/L and growing of two rows of maize/sorghum (jowar) as boarder crop in the main field along with sliver agrimulch sheet + spray of imidacloprid @ 2g/15L + Neem oil @ 2.0ml/L at 7 days interval till fruit formation followed by treatment T-5. Initial two years availability of



Cyantraniliprole has recorded leaf curl incidence of 7.4% with maximum yield (113.0 q/ha) and CB ratio (1:1.42).

### 8.20 IDM package for tomato diseases

At Coimbatore, Parbhani and Hessaraghatta, integrated management module comprising of Covering of nursery with 40-60 mesh white nylon net until transplanting, Border crop with maize in main field Nursery treatment (application of Seed Pro bio-formulation: Seed priming @ 4g/kg, ii) soil application @10 g/Kg of soil while potting, and iii) soil drenching @ 5% after seed germination) and main field treatment (Seedling Dip with 0.1 % (Carbendazim 12% + Mancozeb 63% WP) + spray with Acephate 75% WP @1.5 g/l on 10 days after transplanting + spray with Fipronil 5% SC @ 1.5 ml/l on 20 DAT+ spray with Copper hydroxide 77% WP (2.0 g/l) on 25 DAT + spray with imidacloprid 70% WG @ 2g / 15 l on 40 DAT + spray with Fenamidone 10% + Mancozeb 50% WDG (0.25%) two to three times from 45 DAT at 10 days intervals) was found most effective in the management of tomato diseases (damping off, early blight, late blight, bud necrosis and leaf curl disease) and maximum fruit yield. Pesticide Residue Analysis for this treatment revealed that no pesticides have been detected. The C:B ratio was varied from 1:2.54 to 1:10.30. Therefore, this treatment has been recommended for management of tomato diseases at Coimbatore (hy.Tomato Co3), Parbhani (S-22) and Hessaraghatta (NS501).

### Veg 8.22. IDM packages for cucurbit diseases

At Lam (Ridgegourd cv.Local), Junagadh (Bottle gourd cv. Pusa Naveen) and Parbhani (Cucumber cv. Pune Khira) Integrated management practice module involving growing of two rows of maize as border crops and use of agri silver mulch sheet followed by seed treatment with carbendazim 12%+ mancozeb 63% @ 3 g/kg and drenching of captan 70% + hexaconazole 5%WP @ 0.1% 15 days after germination followed by spraying of tebuconazole 50% + trifloxystrobin 25% @ 1g/l + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 L+ Neem oil 0.2%) followed by fosetyl-Al @ 0.1% followed by spraying of tebuconazole 50% + trifloxystrobin 25% @1g/l + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + neem oil 0.2%) followed by fosetyl-Al @0.1% at 10 days interval was highly effective in reducing severity of damping off (0.9 – 7.01), alternaria leaf blight (4.08%), cercospora leaf spot (5.43%), downy mildew (4.04-6.37%) and mosaic diseases (6.56-23.58%). Pesticide Residue Analysis for this treatment revealed that no pesticides have been detected. The C:B ratio for the above treatment was ranging between 1:1.34 to 1:17.91.

At Varanasi (Bitter gourd cv. Kalyanpur Barahmasi) and Bhubhaneswar (Cucumber cv. Kumuda) integrated module comprising of growing of two rows of maize as border crops and use of agri silver mulch sheet followed by Seed treatment with carbendazim 12% + mancozeb 63% @ 3g/kg and drenching with captan 70% + hexaconazole 5% WP @ 0.1% at 15 daysafter germination followed by spray with (imidacloprid 17.8SL @7.5ml/ 15L+Neemoil 0.2%) followed by spraying of captan 70% + hexaconazole 5% WP @ 0.1% followed by Fosetyl-Al @0.1% followed by spraying of captan 70% + hexaconazole 5% WP @ 0.1% + spray with (imidacloprid 17.8SL @7.5ml/ 15L + Neemoil 0.2%) followed by Fosetyl-Al @0.1% at 30 days drenching has recorded minimum severity of mosaic (14.3-54.21), downy mildew (17.8-35.82%), leaf spot (54.64%), powdery mildew (64.0%) and collar rot diseases (12.7%). The C:B ratio for the above treatment was ranging between 1:2.07 to 1:3.5.

Though some of the centers have compiled three years data of the trial Veg 8.18, Veg. 8.19, Veg 8.20 and Veg 8.22 yet some technical informations are missing therefore these centres may resubmit the data for incorporation of their recommendation in ensuing year.

**TECHNICAL PROGRAMME (2019-20)**

<b>S. No.</b>	<b>Crop (s)</b>	<b>Experiment and year of start</b>	<b>No. of Centres</b>	<b>Location</b>
Veg. 8.22	Cucurbits: Bitter gourd, Bottle gourd, Ridge gourd, Pointed gourd and Cucumber	IDM package for cucurbit diseases (2015).	8	Coimbatore, Durgapura, Kalyanpur, Raipur, Sabour, Vellanikkara, Srinagar, Allahabad
Veg. 8.23	Capsicum	Bio-intensive management of diseases of capsicum under poly house (2015).	05	Hessaraghatta, Hyderabad, Vellanikkara, Solan, Ludhiana
Veg. 8.24	Major crops grown in the locality	Monitoring emerging diseases of vegetable crops (2016).	19	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda
Veg. 8.25	Tomato/ Okra/ Chilli	Assessment in yield losses due to major diseases in vegetable crops (2016)	19	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda
Veg.8.26	Tomato	IDM for bacterial wilt management of tomato (2018)	7	Kalyani, Vellanikarra, Bhubneswar, Coimbatore, Hessaraghtta, Rahuri, Solan
Veg.8.27	Cucurbits	Identification of causal agent involved in stem splitting and gummy stem blight in cucurbit crops (2018)	15	Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Sabour, Varanasi, Vellanikkara, Banda
Veg.8.28	Bitter gourd	Integrated management of bitter gourd virus diseases (2018)	18	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Varanasi, Vellanikkara, Banda
Veg. 8.29	Okra	Integrated management of virus disease in okra (2019)	11	Ludhiana, Bhubaneswar, Kalyani, Parbhani, Kalyanpur, Rahuri, Varanasi, Durgapura, Lam, Hyderabad, Coimbatore
Veg. 8.30	Legumes (Beans/ Cowpea/ Vegetable Pea	Management of foliar blight disease of Leguminous Vegetable crops	05	Vellanikkara, Durgapura, Solan, Junagadh, Lam
			<b>107</b>	

**New Trials****Veg. 8.29: Integrated management of virus disease in okra (2019)**

**Centres allotted:** Ludhiana, Bhubaneswar, Kalyani, Parbhani, Kalyanpur, Rahuri, Varanasi, Durgapura, Lam, Hyderabad and Coimbatore

T0	Mulching with Agrimulch silver polythene sheet + Seed treatment with Thiomethoxam 30% FS@ 4g/kg of seed
T1	T0+Spray of sea weed extract 0.2% at 10 days interval (4 sprays)
T2	T0+Spray of antimicrobial consortia (AMC) 5ml/lit at 10 days interval (4 sprays) (AMC will be supplied by ICAR-IIHR, Bengaluru)
T3	T0+Spray of neem oil @ 3ml/l at 10 days interval (4 sprays)
T4	T0+Spray of pyriproxyfen (5% EC) + fenpropathrin (15% EC) @ 1 ml/l at 10 days interval (4 sprays)
T5	T0+Spray of spiromesifen 22.9% SC @ 1 ml/l at 10 days interval (4 sprays)
T6	T0+Spray of buprofezin 25% SC @ 2ml/l at 10 days interval (4 sprays)
T7	T0 + sequential spray of pyriproxyfen (5% EC)+ fenpropathrin (15% EC), spiromesifen 22.9% SC, buprofezin 25% SC and neem oil at 10 days interval
T8	Control

The spray needs to be taken up to flowering starting from 10th day after sowing

**Observations: Data to be recorded for incidence of viral diseases (YVMV/OELCV) and yield (q/ha)**

**Veg. 8.30: Management of foliar blight disease of Leguminous Vegetable crops**

**Centres allotted:** Vellanikkara, Durgapura, Solan, Junagadh, Lam

**Treatments**

- T0 Seed treatment with *Trichoderma viride* @ 4g/kg + application of 50 kg FYM fortified with 5q neem cake and 2.5 kg *Trichoderma viride*/ha 15 days prior to sowing is (common in all treatment except control) (*Trichoderma viride* supplied by Dr. Sandeep Kansal, Prof., Dr. YSPUH&F, Solan)
- T1 Four foliar sprays of copper fungicide (COC @ 0.3%/copper hydroxide @ 0.2%) at 10 days interval started with the initiation of disease
- T2 Four foliar sprays of streptocycline @ 100 ppm + carbendazim 12% + mancozeb 63% @0.2% at 10 days interval started with the initiation of disease
- T3 Four Foliar sprays of streptocycline @100 ppm + tebuconazole 50% + trifloxystrobin 25%WG @ 0.1% at 10 days interval started with the initiation of disease
- T4 Four foliar sprays of copper fungicide (Bordeaux mixture (0.8%) / COC @ 0.3% /copper hydroxide @ 0.2%) and carbendazim 12%+ mancozeb 63% @0.2% in alternate spray at 10 days at 10 days interval started with the initiation of disease
- T5 Four foliar sprays of copper fungicide and tebuconazole 50% + trifloxystrobin 25% WG @0.1% in alternate spray at 10 days interval started with the initiation of disease
- T6 Four foliar sprays of *Trichoderma viride* @ 2% at 10 days interval started with the initiation of disease
- T7 Control

**Observations: Data to be recorded for PDI of blight incidence and yield (q/ha)**

## SESSION-VIII

### Physiology, Biochemistry and Processing

Chairman	:	Dr. D. P Ray, Ex. Vice Chancellor, OUAT, Bhubaneswar
Co-chairman	:	Dr. P. Jeyakumar, Professor and Head, TNAU, Coimbatore
Convener	:	Dr. Sudhir Singh, Pr. Scientist, IIVR, Varanasi
Rapporteur	:	Dr. Neena Chawla, Sr. Biochemist, PAU, Ludhiana

At the outset, the chairman welcomed the delegates attending the session. In his introductory remarks, the chairman emphasized the importance of vegetables for food and nutritional security as the vegetables are rich sources of vitamins especially folic acid, minerals, fibres and phyto-chemicals. Thereafter, the Chairman requested for the presentation of results of various trials conducted during 2018-19.

**Under Biochemistry trials** during 2018-19, PAU, Ludhiana had carried out biochemical estimation of antioxidant components in tomato, pumpkin, bitter melon and muskmelon genotypes. Various quality parameters such as vitamin C, TSS, carotenoids, lycopene and total sugar content were assessed in different genotypes of vegetable crops.

**In another Bio-chemistry trial**, oxalate content in tomato varieties was estimated at PAU, Ludhiana and IIVR, Varanasi. Both centres have estimated oxalate content and acidity content as citric acid in different AVT-I and AVT-II tomato lines of AICRP trials at ripe stage of harvest. Oxalate content varied from 6.24 and 6.38 mg/100g in 2017/TODVAR-6 and 2016/TODVAR-9 in AVT-I and AVT-II lines, respectively. Acidity level varied 0.33-0.47% as citric acid in 2017/TODVAR-6 and 2017/TODVAR-10 in AVT-I lines.

**Under processing trials** during 2018-19, assessment of tomato varieties under AVT- I and AVT-II for processing quality traits were carried out at IIVR, Varanasi, PAU Ludhiana. Total soluble solids ranged 3.27-4.15% and 3.72-4.34% in tomato AVT-I and AVT-II tomato lines, respectively. Lycopene ranged 2.09-2.44 mg/100g and 2.06-2.77 mg/100g, in tomato AVT-I and AVT-II, lines, respectively.

**In another processing trial** during 2018-19, tomato varieties under AVT-I and AVT-II AICRP trials suitable for processing were carried out at IIVR, Varanasi. Processed tomato pulp contained higher TSS, lycopene and acidity as well as lower oxalate content as compared to unprocessed tomato pulp of AVT-I and AVT-II lines.

**TECHNICAL PROGRAMME (2019-20)**

**Biochemistry Trials**

**i) Biochemical estimation of antioxidant components in tomato, pumpkin, bitter gourd and muskmelon under AVT-II trials**

Centres allotted	PAU- Ludhiana, IIHR- Bangalore and SKUAST- Kashmir
Varieties	Tomato, Pumpkin, Bitter gourd and Muskmelon
Design	RBD with three replications
Stage of harvest	Maturity
Observations to be recorded	Ascorbic acid, lycopene, carotenoids, phenols and antioxidant activity

**ii) Estimation of oxalate content in tomato AVT-II varieties under AICRP (VC) trials and correlation with acidity**

Centres allotted	PAU- Ludhiana, IIHR-Bangalore, IIVR-Varanasi
Varieties	AVT-II varieties under AICRP trials
Design	RBD with three replications
Stage of harvest	Ripe
Observations to be recorded	Acidity (% citric acid), oxalate (mg/100g)

**Processing trials**

**i) Quality evaluation of tomato lines under AVT-II AICRP trials during ripe stage of harvest**

Centres allotted	PAU-Ludhiana, IIHR- Bangalore, IIVR-Varanasi
Varieties	AVT-II varieties under AICRP trials
Design	RBD with three replications
Stage of harvest	Ripe
Observations to be recorded	Ascorbic acid, lycopene, hardness, total soluble solids and acidity

**ii) Tomato varieties under AVT-II AICRP trials suitable for processing**

Centres allotted	PAU-Ludhiana, IIHR-Bangalore, IIVR-Varanasi
Varieties	AVT-II varieties under AICRP trials
Design	RBD with three replications
Stage of harvest	Ripe
Observations to be recorded	Lycopene, ascorbic acid, total soluble solids and acidity

**New trials for 2019-20**

**Processing trials**

**i) Quality assessment of bitter gourd genotypes under AVT-II after processing to bitter gourd chips**

Centres allotted	IIHR-Bangalore and IIVR-Varanasi
Design	RBD with three replications
Varieties	Promising AVT-II varieties of AICRP trials
Stage of harvest	Ripe
Observations to be recorded	Vitamin C, total carotenoids, dry matter and percentage recovery

**The following suggestions/recommendations emerged from the discussion**

1. All sets of AVT-II trials should be included for biochemical studies.
2. All the centres should follow the appropriate statistical analysis.
3. The concerned PI's of all the centres should present the results for better clarification and discussion.
4. All experiments should be strictly carried out as per the approved technical programme.
5. Commercial exploitation of vegetables for processing should also be worked out.
6. Indian Agricultural Research Institute, New Delhi should also be included as one of the centres conducting trials as per the technical programme approved for the session of Physiology, Biochemistry and Processing.

The meeting ended with vote of thanks to chair.

## SESSION-IX

### Insect Pest Management

Chairman	: Dr. J.S. Kennedy, Dean (PGS), TNAU, Coimbatore
Co-Chairman	: Dr. A.B. Rai, Ex-Head, ICAR-IIVR, Varanasi
Convener	: Dr. Jaydeep Halder, Scientist, ICAR-IIVR, Varanasi
Rapporteurs	: Dr. Prasannakumar, N.R., Scientist, ICAR-IIHR, Bengaluru Dr. S.A. Pawar, Junior Entomologist, MPKV, Rahuri

The chairman formally welcomed the participants and briefed about the technical programme of the year 2017-18 and 2018-19 on insect pest management held on 23/06/2019. During the year 2017-18, a total of 81 trials were allotted among 11 coordinating centers. Out of 81 trials, 80 were trials were conducted. Whereas, during the year 2018-19, a total of 90 trials were allotted among 11 coordinating centers, of which, 55 were conducted and 35 trials are in progress.

The following four scientists presented the progress report of 2017-18 and 2018-19.

1. Dr. Anita, D., SKLTSHU, Hyderabad (9.1.1 to 9.4.1)
2. Dr. S.A. Pawar, MPKV, Rahuri (9.5.1 to 9.5.4)
3. Dr. Waluniba, Nagaland University, Medziphema (9.6.1 to 9.7.1)
4. Dr. Sukhjeet Kaur, PAU, Ludhiana (9.8.1 to 9.12.1)

#### The following suggestions were made during the deliberations

- Biocontrol trials may be initiated with inclusion of entomopathogens like *Beauveria bassiana* and *Metarhiziumanisoplae* for biting and chewing insects and *Lecanicillium lecanii* for sucking pests
- The centres which have completed three years for any experiments should come with final recommendations with CB ratio.
- In 9.1.1 trial, cassava based biopesticides are not been supplied for several years, so, this trial should be stopped and new trail in its place may be initiated.
- Observation(s) on new invasive pests viz., Fall army worm, *Spodoptera frugiperda* and shift in pest status from secondary to primary or emerging ones may be monitored.
- In nematology trials, number of cfu should be mentioned for biopesticides.
- No. of pheromone traps for mass trapping of *Tuta absoluta* should be increased.
- Seasonal pest incidence should be correlated with weather parameters and forecasting model(s) may be formulated after having sufficient data.

The following recommendations were emerged from the experimental results of the different AICRP centres:

#### Recommendations

- In search of suitable new alternatives to neonicotinoid insecticides against sucking insect pests of okra, two sprays of Flupyradifurone 200 SL @ 250 g a.i/ha at 10 days interval starting with initiation

of infestation of leaf hoppers and whiteflies on okra is recommended first for their management based on the three years experiments under Hyderabad condition which recorded maximum marketable yield (11.56 t/ha) and lowest whitefly (4.02 whiteflies/5 leaves) and jassid (1 jassid/5 leaves) population as against (5.69 t/ha) in untreated control. Similarly two sprays of Flonicamid 50 WG @ 100 g a.i. /ha at an interval of 10 days starting from initiation of sucking pest infestation in okra was also found equally effective.

- Based on the three years observations, the integrated module comprising seed treatment with Thiomethoxam 70WS @ 5-10 g/kg seed, removal of infested cotyledonary leaves 7 days after germination, spraying Eamectin benzoate 25 WG @ 0.4 g/l, Neem oil 3000 ppm @ 5 ml/l, Spinosad 45 SC @ 0.3 ml/l and installation of cue lure traps @ 15/acre was superior in terms with lowest red pumpkin beetle population and fruit fly damage accompanied with significantly highest fruit yields of 16.06 t/ha under Hyderabad conditions. So, this integrated module could be taken advantage for the insect pest management in cucurbits.

### Nematology

- The experiment on “Bio-efficacy of liquid formulation of biopesticide in the management of *Meloidogyne incognita* infecting tomato” conducted for three years (2015-16, 2016-17, 2017-18) in tomato revealed substrate treatment with *Bacillus subtilis* or *B. amyloliquefaciens* 1% A.S. ( $2.3 \times 10^9$  cfu per ml) @ 5 ml/ kg cocopeat in portraits and soil application of 20 tons of FYM enriched with either of them at 5 l/ha recorded significantly higher yield (29.06-30.82% increase over control) and lower nematode population in soil and roots of tomato (70.33-71.02% decrease) with cost benefit ratio (1:2.10 – 1:2.12) under Bangalore conditions.
- In tomato, substrate treatment with *Bacillus amyloliquefaciens* 1% A.S. ( $2.3 \times 10^9$  cfu per ml) @ 5 ml per kg of coco peat for producing seedlings of tomato in portraits + application of 20 tons of FYM enriched with 5 lit of *B. amyloliquefaciens* 1% A.S. ( $2.3 \times 10^9$  cfu per ml) /ha was effective with 44% reduction in final population of root knot nematode, *M. incognita* and 18.9% increase in marketable yield with C:B ratio 1:1.47 under Punjab condition.
- Pooled analysis of three years (2015-16, 2016-17, 2017-18) of the experiment on ‘Bioefficacy of liquid formulations of biopesticides in the management of *Meloidogyne incognita* infecting okra’ revealed that seed treatment of okra with *Bacillus pumilus* 1% A.S. or *Pseudomonas putida* 1% A.S. ( $2.5 \times 10^9$  cfu per ml) @ 10 ml/kg seed and application of 20 tons of FYM enriched with *B. pumilus* or *Pseudomonas putida* 1% A.S. ( $2.5 \times 10^9$  cfu per ml) @ 5 lit per ha recorded maximum decrease in *M. incognita* population (66.51% - 67.57%) and higher yield (29.44% - 30.83%) with the C:B ratio of 1:1.91 to 1: 1.93 under Bangalore conditions.
- In okra grown under Punjab conditions, seed treatment with *Pseudomonas putida* 1% A.S. ( $2.5 \times 10^9$  cfu per ml) @ 10 ml/kg and application of 20 tons of FYM enriched with *Pseudomonas putida* 1% A.S. ( $2.5 \times 10^9$  cfu per ml) @ 5 lit per ha reduced *M. incognita* population (39.82%) and increased yield (42.8%) with the C:B ratio of 1:2.06.



**TECHNICAL PROGRAMME (2019-20)****Trials in Entomology**

<b>Crops</b>	<b>Code</b>	<b>Name of Experiment (Year of start)</b>	<b>Centres allotted</b>	<b>No. of centres</b>
Brinjal	9.1.2	Evaluation of different insecticide use strategies as resistance management and control tactics for shoot and fruit borer <i>Leucinodes orbonalis</i> in brinjal (2014-15).	Banda, Hyderabad, Nagaland	3
	9.1.3	Evaluation of biopesticides and insecticides for management of sucking pests complex in brinjal (2017-18)	Ludhiana, Sabour, Rahuri, Raipur, IIVR	5
	9.1.4	Evaluation of different pest management modules against major insect pests of brinjal (2019-2020)	Rahuri, Raipur, Ludhiana, Sabour, Hyderabad, Dharwad	6
Okra	9.2.1	Evaluation of new alternatives to neonicotinoid insecticides against sucking insect pests of okra (2015-16).	Sabour, Hyderabad, Ludhiana, Banda, Raipur, Dharwad	6
	9.2.2	Development and evaluation of IPM modules for insect pest complex in okra (2017-18)	Sabour, IIHR, Rahuri, Raipur, Solan, Nagaland	6
Chilli/ Capsicum	9.3.1	Evaluation of pest management module for sucking pests complex in chilli (2014-15)	Sabour, Nagaland	2
Cabbage	9.4.1	Eco friendly management of insect pest of cabbage (2014-15)	Katrain, Nagaland	2
Tomato	9.5.1	Management of insect-pests of tomato (2014-15)	Sabour	1
	9.5.2	Survey and surveillance for new invasive insect pest <i>Tuta absoluta</i> in tomato (2015-16)	IIVR, IIHR, Sabour, Ludhiana, Rahuri, Hyderabad, Solan, Raipur, Nagaland	9
	9.5.3	Evaluation for identification of effective insecticides against <i>Tuta absoluta</i> in tomato (2015-16)	Rahuri, Hyderabad	2
	9.5.4	Development and evaluation of IPM modules for tomato pin worm <i>Tuta absoluta</i> (2017-18)	Hyderabad, Rahuri, IIHR, IIVR, Raipur, Solan	6
Cucurbits	9.6.1	Evaluation of different pest management modules in cucurbits (2014-15)	Hyderabad, Solan, Katrain	3
	9.6.2	Evaluation of different pest management modules against vector and sucking pests management of Bitter melon (2018-19)	IIHR, IIVR, Hyderabad, Nagaland, Rahuri, Ludhiana	6
	9.6.3	Evaluation of some novel insecticide	Nagaland, Sabour, Solan,	

		molecule against whitefly of cucumber (2018-19)	Ludhiana	4
	9.6.4	Evaluation of some entomopathogenic fungi and their compatibility with neem oil against whitefly of cucumber (2018-19)	IIHR, Hyderabad, Rahuri, Solan	4
Others	9.7.1	Seasonal incidence of major and emerging insect pests of vegetable crops	All centers	12

Crop	Code	Nematology Trials 2019-20	Centers allotted	
Tomato	9.9.2.	Management of Root-knot nematodes ( <i>M. incognita</i> ) on tomato under open field conditions(2017-18)	Ludhiana, IIHR, IIVR	3
	9.9.3	Integrated Nematode management in tomato under protected conditions (2019 -2020)	Ludhiana, IIHR	2
Cucumber	9.10.1	Management of Root-knot nematodes ( <i>M. incognita</i> ) in cucumber under protected conditions (2017-18)	Ludhiana, IIHR, IIVR	3
	9.10.2	Evaluation of talc based formulation of <i>Bacillus subtilis</i> (CRB7) in the management of <i>Meloidogyne incognita</i> infecting Cucumber (2018-19)	Ludhiana, IIHR, IIVR	3
Others	9.11.1	Screening of tomato and brinjal germplasm resistant/tolerant to soil-borne pathogens for resistance to root knot nematode <i>M. incognita</i> race 1. (2015-16)	Ludhiana, IIHR, IIVR	3
Brinjal	9.12.1	Bio-efficacy of liquid formulation of bio-pesticide <i>Bacillus megaterium</i> in the management of <i>Meloidogyne incognita</i> infecting Brinjal (2018-19)	Ludhiana, IIHR, IIVR	3
		<b>Total</b>		<b>94</b>

### New Trial initiated

#### **Evaluation of different pest management modules against major insect pests of brinjal (2019-20)**

Centres allotted : Rahuri, Raipur, Ludhiana, Sabour, Hyderabad, Dharwad

Variety : Local popular variety/hybrid

DOT :

Design : RBD

Plot size : 5 x 6 m

Spacing : 1 m x 80 cm

Treatments : 4

Replication : 5

## Treatments details

### T1-Bio-intensive pest management module (BIPM)

- Spraying of Azadirachtin 1500 ppm @ 5 ml/L of water at 20 DAT
- Spraying of *Bacillus thuringiensis* @ 2 g/L at 30 DAT
- Spraying of *Beauveria bassiana* @ 5 g/L at 40 DAT
- Spraying of *Lecanicillium lecanii* @ 5 g/L at 50 DAT
- Spraying of *Bacillus thuringiensis* @ 2 g/L at 60 DAT
- Spraying of *Metarhizium anisopliae* @ 5g/L at 70 DAT

### T2-Chemical pest management module (CPM)

- Spraying of Quinalphos 25 EC @ 2 ml/ L at 20 DAT
- Spraying of Fenpropathrin 10 EC @ 0.75 ml/L or Fenpropathrin 30 EC @ 0.4 ml/lit at 30 DAT
- Spraying of Emamectin benzoate 5 SG @ 0.4 g/L at 40 DAT
- Spraying of Indoxacarb 14.5 SC @ 0.75 ml/L at 50 DAT
- Spraying of Chlorantraniprole 18.5 SC @ 0.3 ml/L at 60 DAT
- Spraying of Spinosad 45 SC @ 0.3ml/L at 70 DAT

### T3-Ingrated pest management module (IPM)

- Spraying of Emamectin benzoate 5 SG @ 0.4 g/L at 20 DAT
- Spraying of *Bacillus thuringiensis* @ 2 g/L at 30 DAT
- Spraying of Indoxacarb 14.5 SC @ 0.75 ml/L at 40 DAT
- Spraying of Neem oil (0.5%*i.e.*, 5 ml/L ) + *Beauveria bassiana* @ 2.5 g/L at 50 DAS
- Spraying of Chlorantraniprole 18.5 SC @ 0.3 ml/L at 60 DAT
- Spraying of *Metarhizium anisopliae* @ 5g/L at 70 DAT

### T4-Untreated control

Common practices to be followed for all the treatments except T4-Untreated control

- Installation of yellow sticky trap and pheromone traps @ 25-30/ha each
- Seedling root dip with Chlorantranilprole 18.5 SC @ 1 ml/L for 3 hours
- Clipping and destruction of infested shoots and fruits

## Observations

No. of whitefly/leaf (3 leaf/plant on randomly selected 10 plants)

No. of jassids/leaf (3 leaf/plant on randomly selected 10 plants)

No. of shoot damage (%), fruit damage (%), both on number and weight basis

No. of spiders or any other natural enemies per plant

Yield (q/ha) and B:C ratio

Per cent pest reduction (%)= $[1-(T_a/T_b * C_b/C_a)] * 100$

Where:  $T_a$ : Pest population after treatment

$T_b$ : Pest population before treatment

C<sub>a</sub>: Pest population in control after treatment

C<sub>b</sub>: Pest population in control before treatment

Avoidable Yield loss (%):  $(T-C/T)*100$

Where: T= Yield from treated plot (q/ha)

C=Yield from control (q/ha)

## **Nematology**

### **New trials 2019-20**

#### **Integrated Nematode management in tomato under protected conditions (2019 -2020)**

**Centres allotted:** PAU, Ludhiana; IIHR,

**Variety:** Any popular variety suitable for polyhouse cultivation

**Treatments – 4; Replications – 6; Design -RBD**

#### **T1 -Bio-intensive nematode management module**

- a. Substrate treatment with *Pseudomonas fluorescens* 1% W.P. @ 10 ml per kg +
- b. Bed application of biopesticide enriched FYM @ 2 kg per m<sup>2</sup> (enrichment with 2 kg each of *Pochonia chlamydosporia*, *Trichoderma harzianum* and *Pseudomonas fluorescens* per ton of FYM) before planting + Soil drenching of neem cake enriched biopesticides suspension @ 10 % once in 30 days in standing crop (suspension prepared by mixing of 20 kg of enriched neem cake in 200 l of water)

#### **T2 -Integrated nematode management module (INMM)**

- a. Soil application of Fluopyram 400 SC at 500 ml per acre before planting +
- b. Soil drenching of neem cake enriched biopesticides suspension @ 10 % once in 30 days in standing crop (suspension prepared by mixing of 20 kg of enriched neem cake in 200 l of water).

#### **T3 - Chemical management module**

- a. Soil application of Fluopyram 400 SC at 500 ml per acre before planting

**T4 - Untreated control**

#### **Observations to be recorded:**

1. Initial root knot nematode population per 100 cc soil
2. Root knot index at final harvest (0 to 5 scale)
3. Marketable yield (tons /ha)
4. Final nematode population in soil per 100 cc
5. Root population of female nematodes per 5 g root
6. % decrease in soil nematode population
7. % increase in yield

**SESSION – X****Seed Production**

Chairperson	:	Dr. S. Sundareswaran, Director, Seed Centre, TNAU, Coimbatore
Co-Chairperson	:	Dr. B. S. Tomar, Head, ICAR-IARI, New Delhi
Convener	:	Dr. Manimurugan C., Scientist, ICAR-IIVR, Varanasi
Rapporteur	:	Dr. Rajinder Singh, Professor, PAU, Ludhiana Dr. H.Usha Nandhini Devi, TNAU, Coimbatore

The chairperson welcomed the delegates and highlighted the importance of seed production in vegetable crops. He emphasized that organic seed production of vegetables be given importance. The seed production trials for the year 2017-18 and 2018-19 were presented by Dr. Kadam and Dr. Rajinder Singh. The reporting percentage of trials were 100%.

After the presentation and discussion, the chairperson formulated a committee under the chairpersonship of Dr. B.S. Tomar and the committee members comprising of Dr. Rajinder Singh, Dr. Kuldeep Thakur, Dr. Swarnalata Das, Dr. Sandeep Kumar, Dr. H.Usha Nandhini Devi, Dr. Manimurugan C., Dr. K.G. Kadam, Dr. Sumati Narayan and Dr. J. Renugadevi for scrutinizing the results and identifying recommendations, if any, and for finalizing the technical programmes for the year 2019-20.

**Suggestions:**

**During the presentation and discussion, following important suggestions were made.**

1. During formulation of projects the title of the standardisation of vigour experiments need to be modified
2. Organic seed production has to be given importance
3. New varieties and hybrids released from the respective institutions may be utilised for the seed production trials in the place of old varieties
4. Experiments on hybrid seed production of vegetables may be included
5. Experiments on healthy seedling production should be included

**Recommendations:**

1. In the tropical sub humid laterite soils of Vellanikara (Kerala) of zone-VIII, use of mulching with black polythene (200 gauge) had given seed yield (5.7q/ha) with higher seed quality with reduced weed intensity in bitter melon cultivar Preethi.
2. The transplanting of seedlings of carrot c v. Pusa Kesar at 30 x 30 cm (1,11,111 plants/ha) given seed yield of 8.03 q/ha in Keymore Plateau & Satpura Hills of Madhya Pradesh under zone-VII.
3. Spray of micro nutrients mixture (Ferrous sulphate @0.2%, calcium nitrate @ 0.2% and boron @ 0.1%) at 60, 90 and 120 days after transplanting in chilli cv. Kashmir Long-1 given higher seed yield of 9.61 q/ha under Srinagar condition of zone-I.

4. Kashi Kranti variety of okra when sown on third week of June recorded significantly highest seed yield (11.8q/ha) in Varanasi condition of zone-IV.
5. To get maximum seed yield (13.78q/ha) and quality in okra under Punjab conditions of zone-IV, it should be sown during third week of March
6. The trial 6.91 Effect of salicylic acid in seed yield and quality in tomato during water stress period could not be concluded due to unstability of seed yield during three year of trial conduct. There is need to conduct the trial for one more year before its final recommendation.

#### **TECHNICAL PROGRAMME FOR 2019-20**

S. No.	Trials	Code No.	Centres allotted	No. of centres	Remarks
1.	Standardization of vigour tests in vegetable seeds (2008-09)	6.60	Pondichery	1	Pondichery (tomato)
2.	Seed coating in vegetable crops (2011-12)	6.67	Raipur	1	Raipur (Knolkhol)
3	Integrated nutrient management in chilli for seed yield and quality improvement (2014-15)	6.81	Lam	1	Lam (chilli)
4	Physiological maturity and longevity of pumpkin seeds in relation to fruit age and duration of in situ storage (2014-15)	6.84	IIHR	1	IIHR (pumpkin)
5	Influence of foliar spray of micronutrients to enhance seed yield and quality in chilli and tomato (2015-16)	6.87	Lam, Japalpur, Kanpur and Raipur	4	Lam (chilli), Japalpur (chilli), Kanpur (chilli)and Raipur (tomato)
6.	Identification of suitable area and season for seed yield and quality in okra (2015-16)	6.88	IIHR, Raipur	2	IIHR, Raipur
7.	Management of dormancy in vegetables (2016-17)	6.89	IIVR, Ludhiana, IIHR, Coimbatore	4	IIVR (Ash gourd), Ludhiana (tinda), IIHR (Cucumber), Coimbatore (Ash gourd)
8.	Effect of drip irrigation and fertigation schedule on seed yield and quality in vegetable crops (2016-17)	6.90	Rahuri, Lam	2	Rahuri(okra var. Phule Vimukta), Lam (chilli).
9.	Effect of salicylic acid in seed yield and quality in tomato during water stress period	6.91	Bhubaneswar	1	Bhubaneswar (tomato)

10.	Enhancement of storability of vegetable seeds under ambient conditions by zeolite beads (2017-18)	6.92	Lam, IIVR, Bhubaneswar, Coimbatore, Vellanikkara.	5	Lam (Chilli), IIVR (Pumpkin), Bhubaneswar (Bittergourd), Coimbatore (Ridge gourd), Vellanikkara (Ridge gourd)
11	Standardization of seed production technology for Bottle gourd (2017-18)	6.93	PAU, Jabalpur	2	PAU (bottle gourd), Jabalpur (bottle gourd)
12.	Effect of abscisic acid on seed yield and seed quality of cowpea (2017-18)	6.94	Bhubaneswar, Raipur, Vellanikkara	3	Bhubaneswar (cowpea), Raipur (cowpea), Vellanikkara (cowpea)
13.	Studies on organic seed production of radish (2018-19)	6.95	Solan and Srinagar	2	Crop: Radish cv. Chinese Pink
14.	Effect of foliar NPK (19:19:19) and micronutrient application on seed yield and quality of vegetable pea (2018-19)	6.96	Ludhiana, Kanpur, IIVR and Raipur	4	Centers will select their own variety for experiment
15.	Standardization of planting ratio (Female:Male) and spacing for quality seed production of Pusa Snowball hybrid-1 (2018-19)	6.97	Katrain, Solan	2	Crop: Cauliflower cv. Pusa Snowball hybrid-1
16.	Effect of foliar spray of micronutrient and secondary nutrient mixture on seed yield and quality of okra (2018-19)	6.98	Hyderabad, Pondicherry and Vellanikkara	3	Crop: Okra, Centers will select their own variety for experiment
17.	Standardization of initiation of male flower in seed production of parthenocarpic cucumber (2018-19)	6.99	Bhubaneswar (OUAT) and Pantnagar	2	Crop: Cucumber cv. Pant Parthenocarpic cucumber – 1
<b>New trials (proposed)</b>					
18.	Studies on effect of organic nutrient sources on seed production of garden pea (2019-20)	7.00	Solan, Palampur	2	Pea, Centers will select their own variety for experiment
19.	Effect of integrated weed management on quality and seed yield in cucumber (2019-20)	7.01	Rahuri, Kanpur, IIVR, Coimbatore, Jabalpur	5	Cucumber, Centers will select their own variety for experiment
			<b>Grand total</b>	<b>47</b>	

**Centre wise allotment of trials for 2019-20**

Sl. No.	Centre	Code No. of the trials	Total No. of allotted trials
1	Bhubaneswar	6.91, 6.92, 6.94, 6.99	4
2	Coimbatore	6.89, 6.92, 7.01	3
3	IIHR	6.84, 6.88, 6.89	3
4	IIVR	6.89, 6.92, 6.96, 7.01	4
5	Jabalpur	6.87, 6.93, 7.01	3
6	Kanpur	6.87, 6.96, 7.01	3
7	Katrain	6.97	1
8	Hyderabad	6.98	1
9	Lam	6.81, 6.87, 6.90, 6.92	4
10	Ludhiana	6.89, 6.93, 6.96	3
11	Palampur	7.00	1
12	Pantnagar	6.99	1
13	Puducherry	6.60, 6.98	2
14	Raipur	6.67, 6.87, 6.88, 6.94, 6.96	5
15	Rahuri	6.90, 7.01	2
16	Solan	6.95, 6.97, 7.00	3
17	Srinagar	6.95	1
18	Vellanikkara	6.92, 6.94, 6.98	3
		<b>TOTAL</b>	<b>47</b>

**New trials**

**7.00 Studies on effect of organic nutrient sources on seed production of garden pea**

**Centers: Palampur and Solan**

Crop : Pea

Variety : Punjab 89/ Pusa Parbal

Design : RBD

Plot size : 3 x 3m

Replications: 3

**Treatments :**

- 1.No Organic manure (control)
2. Jeevamrit @ 5% drenching (3drenching at 15 days interval starting from 30 DAS)
3. FYM @ 10 t/ha + Jeevamrit@ 5% drenching
4. FYM @ 15 t/ha + Jeevamrit@ 5% drenching
5. FYM @ 20 t/ha + Jeevamrit@ 5% drenching
6. Vermicompost @ 5t/ha Jeevamrit@ 5% drenching



7.Vermicompost @ 10t/ha Jeevamrit@ 5% drenching

8.FYM @ 10 t/ha + Vermicompost @ 5 t/ha+ Jeevamrit@ 5% drenching

\*Biofertilisers( Rhizobium +AM (Arbuscular Mycorrhiza)) will be given as seed and soil application

### **Observations**

1. Plant height (cm)
2. Pod length (cm)
3. No.of pods per plant
4. No.of seeds per pod
5. Raw seed yield (kg/plot and q/ha)
6. Seed recovery (%)
7. Graded seed yield (kg/plot and q/ha))
- 8.100 seed weight (g)
9. Germination percentage
- 10.Seed Vigour Index I
11. Seed Vigour Index II

### **7.01 Effect of integrated weed management on quality and seed yield in cucumber**

**Centre : Rahuri, Kanpur, Varanasi**

Crop : cucumber

Design : RBD

Plot size: 5 x 3 m

Replication : 3

#### **Treatments :**

1. Pre emergence application of Pendimethalin @ 0.75 kg a.i/ha
2. Pre emergence application of Pendimethalin @ 0.75 kg a.i/ha + one hand weeding 45 DAS
3. Post emergence application of Quizalofop @ 40 g/ha at 25 days after sowing
4. Post emergence application of Quizalofop @ 40 g/ha at 25 days after sowing + one hand weeding 45 DAS
5. Pre emergence application of Pendimethalin @ 0.75 kg a.i/ha + Post emergence application of Quizalofop @ 40 g/ha at 25 days after sowing
6. Pre emergence application of Pendimethalin @ 0.75 kg a.i/ha + Post emergence application of Quizalofop @ 40 g/ha at 25 days after sowing + one hand weeding 45 DAS
7. Mulching with black polyethylene
8. Organic mulch
9. Hand weeding 25 and 45 DAS
10. Weed free check
11. Weedy check

**Observations**

1. Vine length (cm)
2. No.of days to first female flower
3. No. of fruits/plant
4. Fruit length (cm)
5. No.of seeds per fruit
6. 100 seed weight (g)
7. No.of weeds (grassy/broad leaf/sedges) per m<sup>2</sup>
8. Percentage of 2-3 dominant weeds
9. Weed biomass (Fresh) (g/ m<sup>2</sup>)
10. Dry matter (g/ m<sup>2</sup>)
11. Germination percentage
12. Speed of germination
13. Seed Vigour Index I
14. Seed Vigour Index II

## SESSION–XI

### Breeder Seed Production and Price Fixation

Chairperson	:	Dr. B. S. Tomar, Head, IARI, New Delhi
Co-chairperson	:	Dr. P. Selvaraju, Former Director (Seeds), TNAU, Coimbatore Dr. Renukadevi, Professor, TNAU, Coimbatore
Convener	:	Dr. Manimurugan, Scientist, ICAR-IIVR, Varanasi
Rapporteur	:	Dr. R. K. Yadav, Pr Scientist, ICAR-IARI, New Delhi Dr. Sandeep Kumar, Scientist, ICAR-IARI (RS), Katrain

In the opening remarks, the Chairman, Dr BS Tomar welcomed the participants and emphasized the importance of breeder seeds and its conversion to the foundation and certified seeds thereby enhancement in seed replacement rate (SRR). The chairman urged the agencies to include the new varieties/hybrids in their indents of DAC, GOI to enhance the productivity and profitability of farmers. After his opening remarks, the chairperson asked Dr. Manimurugan C to present the status of breeder seed production for the year 2017-2018 and 2018-2019. Dr. Manimurugan conveyed that during the year 2017-18, a total of 419 quintal breeder seed was produced against the indent of 206 quintal through AICRP centres. However, during the year 2018-19, an indent of 141 quintals for breeder seed of 185 varieties in 34 vegetable crops was received and 160 quintals of Breeder Seeds was produced. Although the status of breeder seeds of many vegetable crops were awaited for the current cropping season (2018-19) from many centres. It is expected that the targeted quantity will be fulfilled once the reports from the all the centres will be made available. Some of the centres have produced additional quantities of seeds for the indented varieties along with some non-indented varieties as well.

#### **During the presentation, the following suggestions/observation were deliberated:**

1. The chairman stressed the popularization of new varieties/hybrids in the national seed production chain through involvement of state/central agencies like NSC, SSC and State Agriculture/horticulture departments.
2. Dr. BS Tomar emphasized for the nucleus seed production by the parent institute only and to report its production and availability status to AICRP (VC) PC cell. This will help to maintain the genetic purity during breeder seed production.
3. It is suggested that PC cell should also invite members of DAC, GOI, NSC, and SSC every year during the AICRP (VC) workshop, especially for this session.
4. For hybrid seed production indent should be given for the breeder seed of parental lines of respective hybrid. Further, it was also decided that breeder seed production of coriander, fenugreek / methi (Kasuri Methi), onion and garlic will be monitored by the respective Project coordinators / Directors.
5. All the institutes were also directed to maintain the different varieties being released from their institute, some centres have also reported the non-availability of nucleus seed of many varieties being indented for breeder seed production.
6. The price fixation for breeder seed of seed spice crops like cumin and fennel should be omitted from AICRP (VC) program, as it should be fixed by AICRP on Seed Spice.
7. A few non-performing centres should be cautioned for better performance.

After the presentation of breeder seed production reports, the prices of breeder seeds were reviewed. The prices were revised considering the input cost of seed production including drastic increase in the labor

wages, fuels, plant protection chemicals, etc. The house agreed upon the increase of the prices of the breeder seeds of different vegetable crops. Accordingly, the following breeder seed price of different vegetable crops was decided for the year 2019-20.

**Table 1: Breeder seed prices of vegetable crops (2019-20)**

Sr. No.	Crop	Existing Rate (Rs/kg) as per XXXVI Group Meeting, RARI, Durgapura (2018)	New Rate (Rs/kg) as per XXXVII Group Meeting, TNAU, Coimbatore (2019)
1	Amaranthus	900	1000
2	Ash gourd	2000	2000
3	Bitter gourd	2200	2400
4	Bottle gourd	1600	1750
5	Brinjal	4000	5000
6	Cabbage	4000	4000
7	Capsicum/Paprika	15000	15000
8	Carrot (Temperate)	4500	4500
9	Carrot (Tropical)	2500	2750
10	Cauliflower (Early/Mid-early/Mid)	4500	5000
11	Chilli	3000	3000
12	Cluster bean	800	800
13	Coriander	600	700
14	Cowpea	650	650
15	Cucumber	3000	3300
16	Dolichos/Lablab bean	500	500
17	Fenugreek	500	500
18	French bean	450	450
19	Garden pea	330	330
20	Garlic	350	350
21	Knol Kohl	3500	3500
22	Late Cauliflower	7000	7500
23	Long melon	2000	2000
24	Methi (Kasuri)	500	500
25	Moringa seed	7000	7000
26	Muskmelon	2200	2400
27	Okra	600	650
28	Onion	3000	3000
29	Palak	350	350
30	Pumpkin	2000	2200
31	Radish	1000	1100
32	Ridge gourd	1800	2000
33	Snake gourd	2000	2000
34	Sponge gourd	1800	2000
35	Summer squash	2200	2200
36	Tinda (Round melon)	1800	1800
37	Tomato	5000	5500
38	Turnip	2000	2000
39	Water melon	4500	5000

**SESSION – XII****Public Private Interface**

Chairperson	:	Dr. Krishna Prashad, Tierra Seed Pvt. Ltd
Co-Chairperson	:	Dr. AS Dhatt, Head, Div. of Veg. Sci, PAU, Ludhiana
Convener	:	Dr TS Aghora, Pr. Scientist, ICAR-IIHR, Bengaluru
Rapporteurs	:	Dr M. Pitchaimuthu, Pr. Scientist, ICAR-IIHR, Bengaluru Dr. Pradip Karmakar, Scientist, ICAR-IIVR, Varanasi

At the outset, the Chairperson emphasized the importance of this session and welcomed all the delegates. He cherished the role of public and private sector organizations in fulfilling the seed requirement of farmers particularly in vegetables. He was appreciating the private industries in their role in supply of farm inputs like fertilizers, pesticides, protected cultivation material etc apart from seeds. He also suggested the need of through discussion relating to the availability, utilization and share of genetic material of public domain. He highlight the role of private sector for the introduction of exotic germplasm in collaboration with NBPGR, utilization speed breeding and double haploid in collaboration with public sector institutions and also stressed the demand of the private industries from the public sector institutions.

Dr. A. S Dhatt, the Co-Chairman of the session emphasized that the vegetable breeding in present time must be initiated on basis of farmers demand and also highlight the involvement of PAU, Ludhiana in sharing the genetic material with private sector from India and abroad. Private sector when licensed a genetic material with public institutions they must market the product/genetic material with its original name. He strongly recommend for the presentation from both public and private sector in the session focusing the need of each other and area of cooperation in the vegetable sector.

Sandeep Barnwal from the Vachan Seeds, highlight the role of public sector institutions and universities in sharing the germplasm with private seed industries and said that they are dependent on the public sector for the germplasm. He also requests the authorities to reduce testing fees of the entries and to decode the entries if feasible.

Dr K.V. Peter, advised that both public and private should work together for the benefit of farming community keeping national interest on priority.

Dr. TS Aghora highlight that the ICAR IIHR actively involved in the public private partnership, they licensed GMS and CGMS lines in okra with more than 40 private seed companies. They also interested to participate in the public private funded research consortium with prior approval of ICAR. He also stressed the need of formulating public-private funded project in emerging challenges.

Project proposals may be prepared on following areas and invite the private companies to take part in the projects.

SN	Project	Institutions
1	LCV in Chilli	IIHR, IIVR and PAU
2	TOSPO in tomato	IIHR and IIVR
3	ELCV in okra	IIVR, IARI and IIHR

The session ended with a vote of thanks to the chair.

## SESSION-XIII

### Protected Cultivation

Chairperson	:	Dr. B. Sreedharan, Dean, AEC&RI, TNAU
Co-Chairperson	:	Dr. D. K. Singh, Prof., GBPUA&T
Convener	:	Dr. S.N.S. Chaurasia, Pr. Scientist, IIVR
Rapporteur	:	Dr. S.S. Hebbar, Pr. Scientist, ICAR-IIHR
	:	Dr. Hare Krishna, Pr. Scientist, ICAR-IIVR

The Chairperson in his opening remarks laid emphasis on significance of protected cultivation for ensuring independent-of-season production of high quality vegetables. Thereafter, the Chairman invited Dr. S.S. Hebbar to present the progress report for the year 2017-18 and 2018-19. During the deliberation, following issues pertaining to protected cultivation which need to be focused, in order to render solutions to the farmers, emerged.

### Suggestions

- It was suggested that before making any recommendation, cost of production per kilogram of produce should be worked out so as to make it comprehensive for farmers to accept any recommended technology.
- It was suggested that low-cost protected structures need to be developed which are suitable for different agro-climatic conditions to promote protected cultivation at large scale by farmers.
- A network project may be proposed to identify suitable varieties and their production technologies tailor-made for protected cultivation.
- Uniform units (e.g. yield in q/ha) should be used while reporting data from various centers.
- To lessen dependency on labour, mechanization under protected cultivation may be taken up. In this context, TNAU has developed a cost effective mechanical as well as an automatic portray filling machine for raising vegetable nursery.
- It was suggested that well performing varieties/hybrids developed by public sector may be identified for protected cultivation.
- Parthenocarpic cucumber should be harvested as specified in the technical programme i.e. <150g weight for avoiding disparity in yield across centres.
- It was suggested that Public-Private Partnership (PPP) mode need to be adopted for development of cost-effective protected structures and disposal of produce at remunerative prices in the market.

Chairman constituted the following committee to draw recommendation from the results presented for the year 2017-18 & 2018-19 and also to formulate the technical programme for the year 2019-20.

1. Dr. D.K. Singh	:	Chairman
2. Dr. S.S. Hebbar	:	Member
3. Dr. Anant Bahadur	:	Member
4. Dr. P.K. Singh	:	Member
5. Dr. Praveen Sharma	:	Member

6. Dr. Sumati Narayan	:	Member
7. Dr. Hare Krishna	:	Member
8. Dr. S.N.S. Chaurasia	:	Member Secretary

#### **Recommendations (2017-18 and 2018-19)**

- At Jabalpur, in cherry tomato, maximum fruit yield (865.9 q/ha) along with net return of Rs 8,53,717/ha and B:C ratio of 4.14 was recorded when hybrid Suncherry Extra Pure was planted at 100 x 45 cm spacing with Pinching & staking. Hence this practice is recommended for Keymore Plateau & Satpura Hills Agro-climatic zone of Madhya Pradesh.
- At Jabalpur, it has observed that the maximum fruit yield (200.0 q/ha) along with net return of Rs 2,27,680/ha and B:C ratio of 4.15 was recorded when tomato was grown in Rain Shelter with a spacing of 100 x 60 cm and hence it is recommended for Keymore Plateau and Satpura Hills Agro-climatic zone of Madhya Pradesh.
- At IIHR, for Parthenocarpic cucumber hybrid, fertigation using 150:112:188 NPK kg/ha was found optimum with a yield of 983q/ha and B:C ratio of 2.07. Hence, it is recommended for polyhouse cultivation of parthenocarpic cucumber in Agroclimatic Zone VIII.
- At Srinagar, Capsicum hybrid Bombay planted under naturally ventilated poly houses at 60X45cm spacing with 4 stem training gave maximum yield of 546.07 q/ha with B:C ratio 7.80. Hence it is recommended for temperate conditions of Kashmir.

**Technical Programme 2019-20**

Sl. No.	Area of research and experiment	Code No.	Centres allotted	No. of Centres
<b>PROTECTED CULTIVATION</b>				
1	Production of <b>Cherry tomato</b> under protected cultivation	5.34	Jammu, Mukteshwar, Palampur,	3
2	Protected cultivation of <b>tomato</b> under rain shelter during kharif season	5.39	Vellanikkara, Johrat	2
3	Protected cultivation in parthenocarpic <b>cucumber</b>	5.39.1	Coimbatore, Hisar, IIVR, Jorhat, Mukteshwar, Palampur, Pantnagar	7
4	Protected cultivation of <b>Tomato</b> under naturally ventilated polyhouse/insect proof nethouse/ shadehouse	13.1	CPCT-IARI, Hisar, IIHR, IIVR, Palampur, Pantnagar, Raipur, Samastipur,	8
5	Fertigation studies in parthenocarpic <b>cucumber</b>	13.2	CPCT-IARI, IIVR, Palampur, Ludhiana, Pantnagar, Srinagar	6
6	Studies on micro nutrient management in polyhouse grown <b>green capsicums</b> (2018-19)	13.3	IIVR, IIHR, Ludhiana	3
	<b>New Experiment</b>			
7	Fertigation studies in hybrid <b>brinjal</b> under nethouse conditions.	13.4	IIVR, IIHR, PAU,CPCT (IARI), Pantnagar, Coimbatore, Sabour	7
8	Evaluation of parthenocarpic <b>cucumber</b> genotypes for protected cultivation.	13.5	IIVR, IIHR, PAU,CPCT (IARI), Pantnagar, Palampur, Hisar, Jorhat, Duragapura, Vellanikkara, Pusa Samastipur	11
9.	Evaluation of <b>cherry tomato</b> genotypes for protected cultivation.	13.6	IIVR, PAU,CPCT (IARI), Pantnagar, Palampur, Jammu, Hisar, Durgapura, VPKAS Almora	9
	<b>TOTAL</b>			<b>56</b>



**Centre wise allotment of trials for 2019-20**

Sl. No.	Centre	Code No. of the trials	Total No. of allotted trials
1	Coimbatore	5.39.1, 13.4	2
2	CPCT-IARI	13.1, 13.2, 13.4, 13.5, 13.6	5
3	Durgapura	13.5, 13.6	2
4	Hisar	5.39.1, 13.1, 13.5, 13.6	4
5	IIHR	13.1, 13.3, 13.4, 13.5	4
7	IIVR	5.39.1, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6	7
8	Jammu	5.34, 13.6	2
9	Jorhat	5.39.1, 5.39, 13.5,	3
10	Ludhiana	13.2, 13.3, 13.4, 13.5, 13.6	5
11	Mukteshwar	5.34, 5.39.1	2
12	Palampur	5.34, 5.39.1, 13.1, 13.2, 13.5, 13.6	6
13	Pantnagar	5.39.1, 13.1, 13.2, 13.4, 13.5, 13.6	6
14	Pusa (Samastipur)	13.1, 13.5	2
15	Raipur	13.1	1
16	Srinagar	13.2	1
17	Sabour	13.5	1
18	Vellanikkara	5.39, 13.5	2
19	VPKAS Almora	13.6	1
		TOTAL	56

**New Experiment****13.4: Fertigation studies in hybrid Brinjal under nethouse conditions (Year of start: 2019-20)****Centres:** IIVR, IIHR, PAU, CPCT (IARI), Pantnagar, Coimbatore, Sabour**Crop:** Brinjal (hybrid)**Variety:** Popular hybrid of the region.**Treatments:** Five

T1: 125:75:125 (N:P:K)

T2: 150:100:150 (N:P:K)

T3: 175:125:175 (N:P:K)

T4: 200:150:200 (N:P:K)

T5: 225:175:225 (N:P:K)

**Replication** : Four**Design** : RCBD**Common Practices:** Application of FYM @ 25 t/ha at the time of soil preparation. Spacing: 150 cm x 90 cm.

**General observations to be recorded**

Date of sowing/ transplanting		
Initial soil NPK and micronutrient status		
Temperature and RH data		
Nematode infestation at final pulling		
Any severe problem with the crop (disease/ insect incidence)		
Is the experiment is reliable?		
Any other comment		

**Observations**

1. Days to 50% flowering
2. Fruit set (%)
3. Days to first harvest
4. Number of fruits/ plant (Average of 5 plants)
5. Avg. Fruit weight (g) (Avg. of 5 fruits)
6. Fruit length (cm)
7. Fruit diameter (cm)
8. Plant height at final harvest (m)
9. Yield per plant (Kg)
10. Yield per plant (q/ha)
11. Cost of cultivation per kg of produce
12. B:C ratio

**13.5: Evaluation of parthenocarpic **cucumber** genotypes for protected cultivation (Year of start: 2019-20)**

**Centres:** IIVR, IIHR, PAU, CPCT (IARI), Pantnagar, Palampur, Hisar, Jorhat, Duragapura, Vellanikkara, Pusa Samastipur

Crop: Parthenocarpic cucumber

Variety: Six

- i. DDPCG-1 (Palampur)
- ii. DDPCW-1 (Palampur)
- iii. Punjab Kheera No. 1 (PAU)
- iv. IARI-1 (IARI)
- v. PPC-2 (Check; Pantnagar)
- vi. PPC-3 (Check; Pantnagar)

Replication : Four

Design : RCBD

**Common Practices:** Recommended package of practices of the region.

**General observations to be recorded**

Date of sowing/ transplanting		
Initial soil NPK and micronutrient status		
Temperature and RH data		
Nematode infestation at final pulling		
Any severe problem with the crop (disease/ insect incidence)		
Is the experiment is reliable?		
Any other comment		

**Observations**

1. Days to first flowering
2. Days to first harvest
3. Number of fruits/ plant (Average of 5 plants)
4. Avg. Fruit weight (g) (Avg. of 5 fruits)
5. Fruit length (cm)
6. Fruit diameter (cm)
7. Vine length at final harvest (m)
8. Yield per plant (Kg)
9. Yield per plant (q/ha)
10. Cost of cultivation per kg of produce
11. B:C ratio

**13.6: Evaluation of cherry tomato genotypes for protected cultivation (Year of start: 2019-20)**

**Centres:** IIVR, PAU, CPCT (IARI), Pantnagar, Palampur, Jammu, Hisar, Durgapura, VPKAS Almora

**Crop:** Cherry tomato

**Variety:** Six

- i. DPCTY-1 (Palampur)
- ii. DPCTR-1 (Palampur)
- iii. SJCTO-1 (Jammu)
- iv. PCT-6 (Pantnagar)
- v. PCT-8 (Pantnagar)
- vi. Punjab Red Cherry (PAU)
- vii. Punjab Sona Cherry (PAU)
- viii. IARI-1 (IARI)
- ix. CPCT Cherry No 214
- x. CPCT Cherry No 263
- xi. VT-95 (Check; VPKAS Almora)

**Replication** : Four

**Design** : RCBD

**Common Practices:** Recommended package of practices of the region.

**General observations to be recorded**

Date of sowing/ transplanting		
Initial soil NPK and micronutrient status		
Temperature and RH data		
Nematode infestation at final pulling		
Any severe problem with the crop (disease/ insect incidence)		
Is the experiment is reliable?		
Any other comment		

### Observations

1. Days to first flowering
2. Days to first harvest
3. Number of fruits/ plant (Average of 5 plants)
4. Avg. Fruit weight (g) (Avg. of 5 fruits)
5. Fruit length (cm)
6. Fruit diameter (cm)
7. Vine length at final harvest (m)
8. Yield per plant (Kg)
9. Yield per plant (q/ha)
10. Cost of cultivation per kg of produce
11. B:C ratio

### Scientists associated/center in-charges in protected cultivation experiments

S.No.	Center	Name	E-mail	Contact no.
1.	IIVR, Varanasi	Dr.SNS Chaurasia	chaurasiaiivr@yahoo.com	7007934402
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3.	IIVR, Varanasi	Dr.Harekrishna	kishun@rediffmail.com	7597743328
4.	IIHR, Bangalore	Dr.Shankara Hebbar	shankara.hebbars@icar.gov.in	9449105802
5.	CPCT,IARI	Dr.P.K.Singh	pksingh128@gmail.com	8130561907
6.	CPCT,IARI	Dr.A K Singh	singhawani5@gmail.com	9013439110
7.	JNKVV, Jabalpur	Dr.AK Naidu	drnaiduak@gmail.com	9425864420
8.	AAU, Jorhat	Dr.S Gagoi	saileng63@rediffmail.com	9435514466
9.	PAU, Ludhiana	Dr.Kulbir singh	kulbirpawar@pau.edu	8146344445
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11.	CSKHPKV, Palampur	Dr.Parveen Sharma	parveens012@gmail.com	9418103265
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15.	BAU, Sabour	Dr. Randhir Kumar	randhirvs@gmail.com	9431384534
16.	SKUAT, Srinagar	Dr. Sumati Narayan	sumatinarayan@gmail.com	9149430092
17.	CCSHAU, Hisar	Dr.DS Duhan		9416397542
18.	TNAU, Coimbatore	Dr.V Rajashri	dr.rajashreeprabhu@gmail.com	9443338837

## **SESSION – XIV**

### **Plenary Session**

Chairperson	:	Dr. N. Kumar, Vice Chancellor, TNAU, Coimbatore
Co- Chairperson	:	Dr. D.P. Ray, Former Vice Chancellor, OUAT, Bhubaneswar
	:	Dr. K.V. Peter, Former Vice Chancellor, KAU, Vellanikkara
	:	Dr. Jagdish Singh, Director, ICAR- IIVR, Varanasi
Rapporteur	:	Dr. S.K. Verma, Pr. Scientist, ICAR- IIVR, Varanasi
	:	Dr. B. R. Reddy, Scientist, ICAR- IIVR, Varanasi

To begin with, Dr. Jagdish Singh, Director, ICAR-IIVR, Varanasi welcomed all the participants and expressed his satisfaction for the deliberations which were held during the 37<sup>th</sup> AICRP-VC meet. Dr. N. Kumar, Vice Chancellor, TNAU, Coimbatore has stressed on the innovative breeding methods, distance hybridization, breeding for multiple resistant, root stock breeding in brinjal, germplasm conservation of wild spices and traditional varieties. He also emphasized the role of private organizations in vegetable breeding for upliftment of vegetable production in India.

Dr. D.P. Ray, Former Vice Chancellor, OUAT, Bhubaneswar expressed his view regarding the need of promoting protected cultivation of horticultural crops, especially vegetables being high value cash crop and for quality seed production. The Chairperson called for the session wise presentation of the programmes. After each presentation & discussion, the following points emerged:

### **Session II: Collection, Evaluation, Conservation and Utilization of Germplasm**

**Presented by: Dr D. R. Bhardwaj (IIVR, Varanasi)**

- 1. Reports from centres on germplasm characterization and evaluation shall be included in the Annual Report of AICRP (VC) only for those accessions/genotypes having IC numbers.** Accordingly all centers must take necessary initiatives for obtaining IC number from NBPGR, New Delhi.
2. PC cell may designate crop-wise nodal centres for management of vegetable genetic resources. These centres would take lead in coordinating the characterization and evaluation of the germplasm.
3. All the centres should evaluate the germplasm along with at least one national and / or one local check for minimum two years as per minimal descriptor lists (already provided to the centres).

### **Session III: Varietal Evaluation**

**Presented by: Dr. Sudhakar Pandey (IIVR, Varanasi)**

1. The newly released and notified variety should be used as national checks in newly constituted IET trials.
2. The performance of AVT II trials (which are going to be concluded), should be presented along with IET & AVT-I data. The trials in IET & AVT- I should also be reviewed judiciously.

#### **Session IV: Hybrid Evaluation**

**Presented by: Dr. N. Rai (IIVR, Varanasi)**

1. The reason for failure of trials should be communicated immediately to the PC Cell with proper justification and appropriate photographs which should be reflected in the final reports.
2. Besides yield, specific characters that are required for which the hybrids is proposed for testing, should be recorded properly.

#### **Session V: Evaluation for biotic and abiotic stresses**

**Presented by: Dr. Arup Chattopadhyay (BCKV, Kalyani)**

1. Trials on bacterial wilt of important Cole crops and Solanaceous crops should be initiated and pathogen should be mentioned.
2. Trials should be formulated on high temperature tolerance in tomato and powdery mildew resistance in pea.
3. Programs on abiotic stresses (salt tolerance/ moisture deficit conditions) on major vegetables should be initiated as it is presently missing in technical programme. Centers should contribute entries in adequate numbers for conduct of these trials.

#### **Session VI: Vegetable Production**

**Presented by: Dr. S.K. Singh (IIVR, Varanasi)**

1. Crop variety name should be indicated during conclusion of INM trials.

#### **Session VII: Disease Management**

**Presented by: Dr. K. Nagendran (IIVR, Varanasi)**

1. Every recommendation must have B:C ratio.
2. Compilation of technologies of disease management recommended by AICRP-VC.

#### **Session VIII: Physiology, Biochemistry and Processing**

**Presented by: Dr. Neena Chawla (PAU, Ludhiana)**

1. In leafy vegetable anti nutritional factors should be carried out.
2. Standard protocols should be followed at all the centres as per AOAC guidelines.

#### **Session IX: Insect Pest Management**

**Presented by: Dr. Jaydeep Halder (IIVR, Varanasi)**

1. Compilation of technologies of insect pest management recommended by AICRP-VC.

#### **Session X: Seed production**

**Presented by: Dr. Rajinder Singh (PAU, Ludhiana)**

1. Compilation of technologies of seed production recommended by AICRP-VC.

**Session XI: Breeder seed production and price review**

**Presented by: Dr. Manimurgan (IIVR, Varanasi)**

1. All the centers should try to achieve the target of seed production.

**Session XIII: Protected Cultivation**

**Presented by: Dr S.N.S. Chaurasia (IIVR, Varanasi)**

1. All the recommendations must include the name of the variety/hybrid and B:C ratio.

**The following varieties/hybrids were identified for release and notification, based on the data for the year 2015-16, 2016-17 and 2017-18 thoroughly**

A total of 22 varieties/hybrids (thirteen varieties: two each in brinjal long-type, tomato (Indet.)-type, radish-type, pea (early)-type and one each in brinjal round -type, cherry tomato-type, capsicum-type, yard long bean-type, French bean (pole type); Seven hybrids- two in tomato (det.) and one each in chilli, capsicum, cauliflower (mid), cabbage, cucumber and two resistant lines - one in YVMV tolerant line of okra) and another one in ToLCV tolerant line of tomato were recommended.

Dr D.P. Ray, Former Vice Chancellor in his concluding remarks stressed on pre-breeding, effective utilization of genes from wild genetic stocks and trait specific germplasm, input use efficiency and precision farming,, weather forecast module for management of pest and diseases, minimizing the use of chemical pesticide and encouraging the use of bio pesticides, entrepreneurship development, processed vegetable product development, cost effectiveness of off season vegetable production and emphasizes his viewed on storage, processing and marketing.

The session ended with a vote of thanks by Dr. L. Pugalendhi, Dean, HC & RI, TNAU, Coimbatore to the chair.

## VARIETAL IDENTIFICATION COMMITTEE

### Proceedings

A committee was constituted under the chairmanship of ADG (HS-I) comprising of following members to identify the variety(ies)/ hybrid(s) for release:

1.	Dr. T. Janakiram, ADG (HS-I)	:	Chairman	6.	Dr. Sudhakar Pandey	:	Member
2.	Dr. K.E. Lawande	:	Member	7.	Dr. S.K. Verma	:	Member
3.	Dr. A.S. Dhatt	:	Member	8.	Dr. B. R. Reddy	:	Member
4.	Dr. T.S. Aghora	:	Member	9.	Dr. Jagdish Singh	:	Member
5.	Dr. Arup Chattopadhyay	:	Member				Secretary

**The committee met on 23<sup>rd</sup> June, 2019 and discussed and finalized the criteria for identification of entries to be recommended for the release as below:**

- An entry performing superior for at least two years at a minimum of two locations at least in one zone may be considered for recommendation.
- The entry must be significantly different from the check(s) with respect to yield along with market driven quality parameters.
- The entry must have minimum benchmark yield specified (Variety/Hybrid) for respective vegetable crops.

**The committee reviewed the data for the year, 2015-16, 2016-17 and 2017-18 thoroughly and following entry was identified for release and notification:**

S. No.	Crop	Code	Name of the entry	Source	Zone
<b>Varietal Trial</b>					
1.	Brinjal Long	2015/BRLVAR-3	PBL-232	PAU, Ludhiana	VI, VII
2.	Brinjal Long	2015/BRLVAR-5	IVBL-23	IIVR, Varanasi	IV
3.	Brinjal Round	2015/BRRVAR-2	DBPR-23	IARI, New Delhi	IV
4.	Cherry Tomato	2015/TOCVAR-5	VT-95	VPKAS, Almora	I, III, VII
5.	Tomato Indet.	2015/TOINDVAR-3	BT19-1-1-1	OUAT, Bhubaneswar	I
6.	Tomato Indet.	2015/TOINDVAR-5	Kashi Tamatar-8	IIVR, Varanasi	IV, VII
7.	Capsicum	2015/CAPVAR-2	KTC-1	IARI (RS), Katrain	I
8.	Yard Long Bean	2015/COPBVAR-4	Arka Mangla	IIHR, Bengaluru	IV, VIII
9.	French Bean (Pole Type)	2015/FPBVAR-1	VPFBP-14	IIVR, Varanasi	I, VII, VIII
10.	Radish	2015/RADVAR-3	VRRAD-150	IIVR, Varanasi	II
11.	Radish	2015/RADVAR-4	UHFR-12-1	Ranichauri	I
12.	Pea (Early)	2015/PEPVAR-3	Mattar Ageta-7	PAU, Ludhiana	IV
13.	Pea (Early)	2015/PEPVAR-4	VP 1305	VPKAS, Almora	I
<b>Hybrid Trial</b>					
1.	Tomato Det.	2015/TODHYB-3	NTH-3072	Nirmal Seeds	I



2.	Tomato Det.	2015/TODHYB-4	CTH-1	TNAU, Coimbatore	VI, VII, VIII
3.	Chilli	2015/CHIHBYB-6	CH-27	PAU, Ludhiana	IV
4.	Capsicum	2015/CAPHYB-3	NCCH-705	Nirmal Seeds	I, VIII
5.	Cauliflower (Mid)	2015/CAUMHYB-2	KTH-301	IARI (RS), Katrain	I, VI
6.	Cabbage	2015/CABHYB-1	KTCBH-822	IARI (RS), Katrain	I, VI
7.	Cucumber	2015/CUCUHYB-4	DGCH-18	IARI, New Delhi	I
<b>Resistant Varietal Trial</b>					
1.	Okra (YVMV)	2015/OKYVRES-4	AOL 12-52	AAU, Anand	V
2.	Tomato ToLCV	2015/ToLCVRES-5	IIHR-331	IIHR, Bengaluru	VIII

### Decoding of the entries

### VARIETAL TRIALS (2015-16, 2016-17 & 2017-18)

#### 1. Brinjal (Long) AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/BRLVAR-2	BRBL-1	2015	Sabour
2.	2015/BRLVAR-5	IVBL-23	2015	IIVR
3.	2015/BRLVAR-1	AB 13-03	2015	Anand
4.	2015/BRLVAR-4	AB 13-14	2015	Anand
5.	2015/BRLVAR-3	PBL-232	2015	Ludhiana

#### 2. Brinjal (Round) AVT-II

Sl.No.	CODE	Entry	Year	Source
1.	2015/BRRVAR-5	IVBR-15	2015	IIVR
2.	2015/BRRVAR-3	IVBR-16	2015	IIVR
3.	2015/BRRVAR-2	DBPR-23	2015	IARI
4.	2015/BRRVAR-4	DBPR-43	2015	IARI
5.	2015/BRRVAR-1	JB-12-06	2015	Junagadh

#### 3. Cherry Tomato AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/TOCVAR-1	BRCT-1	2015	Sabour
2.	2015/TOCVAR-4	SJCT-01	2015	Jammu
3.	2015/TOCVAR-2	ACTL 10-02	2015	Anand
4.	2015/TOCVAR-3	Punjab Red Cherry	2015	Ludhiana
5.	2015/TOCVAR-5	VT-95	2015	VPKAS
6.	2015/TOCVAR-6	Pusa Cherry tomato 1	2015	IARI

#### 4. Tomato (Indeterminate) AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/TOINDVAR-5	Kashi Tamatar-8	2015	IIVR
2.	2015/TOINDVAR-6	VT-1308	2015	VPKAS
3.	2015/TOINDVAR-4	VT-1325	2015	VPKAS
4.	2015/TOINDVAR-3	BT19-1-1-1	2015	Bhubaneswar
5.	2015/TOINDVAR-2	BT 442-2	2015	Bhubaneswar
6.	2015/TOINDVAR-1	PAU INDET Tomato 1	2015	Ludhiana

#### 5. Capsicum AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/CAPVAR-1	SH-SP-603	2015	CITH
2.	2015/CAPVAR-3	SH-SP-1154-3-1	2015	CITH
3.	2015/CAPVAR-2	KTC-1	2015	Katrain
4.	2015/CAPVAR-4	KTC-2	2015	Katrain

#### 6. Pea (Early) AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/PEVAR-4	VP 1305	2015	VPKAS
2.	2015/PEVAR-5	VP 1327	2015	VPKAS
3.	2015/PEVAR-1	HAEP-1	2015	Ranchi
4.	2015/PEVAR-6	HAEP-2	2015	Ranchi
5.	2015/PEVAR-2	UHF P90-2	2015	Ranichauri
6.	2015/PEVAR-7	UHF P100-1	2015	Ranichauri
7.	2015/PEVAR-3	Mattar Ageta-7	2015	Ludhiana

#### 7. French bean (Pole) AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/FBBVAR-2	NHRDF-1 (Green)	2015	NHRDF, Karnal
2.	2015/FBBVAR-4	NHRDF-2(Red)	2015	NHRDF, Karnal
3.	2015/FBBVAR-3	VPFBP-44	2015	IIVR
4.	2015/FBBVAR-1	VPFBP-14	2015	IIVR

#### 8. Yard Long Bean AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/COPBVAR-1	PVCP-20	2015	Pantnagar
2.	2015/COPBVAR-4	Arka Mangla	2015	IIHR
3.	2015/COPBVAR-2	CP-5	2015	IARI
4.	2015/COPBVAR-6	VS-3	2015	Vellanikkara
5.	2015/COPBVAR-3	Vyjayanthi	2015	Vellanikkara
6.	2015/COPBVAR-5	VL Lobia-1	2015	VPKAS

**9. Radish AVT-II**

Sl. No.	CODE	Entry	Year	Source
1.	2015/RADVAR-4	UHFR-12-1	2015	Ranichauri
2.	2015/RADVAR-3	VRRAD-150	2015	IIVR
3.	2015/RADVAR-2	VRRAD-131-2	2015	IIVR
4.	2015/RADVAR-1	RB-21	2015	Ludhiana

**10. Bathua (Chenopodium) AVT-II**

Sl. No.	CODE	Entry	Year	Source
1.	2015/BATHVAR-2	DCHB-2	2015	IARI
2.	2015/BATHVAR-1	DCHB-3	2015	IARI
3.	2015/BATHVAR-3	VRCH-2	2015	IIVR
4.	2015/BATHVAR-5	VRCH-4	2015	IIVR
5.	2015/BATHVAR-4	UHF Bathua-1	2015	Ranichauri

**Hybrids Trials (2015-16, 2016-17 & 2017-18)****1. Tomato Hybrid Det. AVT-II**

Sl. No.	CODE	Entry	Year	Source
1.				
2.	2015/TODHYB-3	NTH-3072	2015	Nirmal
3.	2015/TODHYB-4	CTH-1	2015	Coimbatore
4.	2015/TODHYB-2	CTH-2	2015	Coimbatore

**2. Chilli Hybrid AVT-II**

Sl. No.	CODE	Entry	Year	Source
1.				
2.				
3.				
4.	2015/CHIHBY-2	NCH-1635	2015	Nirmal
5.	2015/CHIHBY-4	NCH-1544	2015	Nirmal
6.	2015/CHIHBY-6	CH-27	2015	Ludhiana

**3. Capsicum Hybrid AVT-II**

Sl. No.	CODE	Entry	Year	Source
1.	2015/CAPHYB-1	DIBER-208	2015	DIBER
2.	2015/CAPHYB-2	DIBER-209	2015	DIBER
3.	2015/CAPHYB-3	NCCH-705	2015	Nirmal
4.	2015/CAPHYB-4	KTCH-133	2015	Katrain
5.	2015/CAPHYB-5	KTCH-151	2015	Katrain

#### 4. Broccoli Hybrid AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/BROHYB-4	DIBER BR-1	2015	DIBER
2.	2015/BROHYB-3	DIBER BR-2	2015	DIBER
3.	2015/BROHYB-2	KTHB-303	2015	Katrain
4.	2015/BROHYB-1	KTHB-304	2015	Katrain
5.				

#### 5. Cauliflower (Mid-Season) Hybrid AVT-II

Sl. No.	CODE	Entry	Year	Source
1.	2015/CAUMHYB-1	DCH-9325	2015	IARI
2.	2015/CAUMHYB-6	DCH-9309	2015	IARI
3.				
4.				
5.	2015/CAUMHYB-2	KTH-301	2015	Katrain
6.	2015/CAUMHYB-3	KTH-303	2015	Katrain

#### 6. Cabbage Hybrid AVT-II

Sl. No.	CODE	Entry	Year	Source
1.				
2.				
3.	2015/CABHYB-5	DIBER-803	2015	DIBER
4.	2015/CABHYB-2	DIBER-804	2015	DIBER
5.	2015/CABHYB-1	KTCBH-822	2015	Katrain

#### 7. Cucumber Hybrid AVT-II

Sl. No.	CODE	Entries	Year	Source
1.				
2.	2015/CUCUHYB-3	DIBER-105	2015	DIBER
3.	2015/CUCUHYB-6	DIBER-106	2015	DIBER
4.	2015/CUCUHYB-5	DGCH-15	2015	IARI
5.	2015/CUCUHYB-4	DGCH-18	2015	IARI
6.				

#### 8. Bitter gourd Hybrid AVT-II

Sl. No.	CODE	Entries	Year	Source
1.	2015/BIGHYB-5	DIBER-BH3	2015	DIBER
2.	2015/BIGHYB-1	DIBER-BH4	2015	DIBER
3.	2015/BIGHYB-3	VRBTGH-15	2015	IIVR
4.	2015/BIGHYB-2	DBGH-159	2015	IARI
5.	2015/BIGHYB-4	Pusa Hyb.-3	2015	IARI

**RESISTANT VARIETAL TRIALS (2015-16, 2016-17 & 2017-18)****1. Okra (YVMV) AVT-II**

S. No.	CODE	Entries	Year	Source
1.	2015/OKYVRES-3	DOV-29	2015	IARI
2.	2015/OKYVRES-2	JOL-11-12	2015	Junagadh
3.	2015/OKYVRES-4	AOL 12-52	2015	Anand
4.	2015/OKYVRES-1	VRO-178	2015	IIVR
5.	2015/OKYVRES-5	HBT-49-1	2015	Hisar

**2. Tomato (ToLCV) AVT-II**

S. No.	CODE	Entries	Year	Source
1.	██████████	██████████	████	██████████
2.	2015/TOLCVRES-2	VRTOLCV-16	2015	IIVR
3.	2015/TOLCVRES-3	JTL-12-07	2015	Junagadh
4.	2015/TOLCVRES-4	Punjab Varkha Bahar-4	2015	Ludhiana
5.	2015/TOLCVRES-5	IIHR-331	2015	IIHR

**LIST OF PARTICIPANTS OF XXXVII GROUP MEETING OF AICRP-VC HELD AT TNAU,  
COIMBATORE FROM 22-25<sup>TH</sup> JUNE, 2019**

<b>S.No</b>	<b>List of Participants</b>
	<b>ICAR Head Quarter</b>
1.	Dr. T. Janakiram, ADG (Hort. Sci.), ICAR, New Delhi
	<b>Special Invitees</b>
2.	Dr. Kriti Singh, Ex. Chairman, ASRB, New Delhi
3.	Dr. K. V. Peter, Ex. Vice Chancellor, KAU, Vellanikkara
4.	Dr. D.P. Ray, Ex. Vice Chancellor, OUAT, Bhubaneswar
5.	Dr. K.E. Lawande, Ex. Vice Chancellor, BSKVV, Dapoli
6.	Dr. B. Singh, Director General, UPCAR, Lucknow
7.	Dr. A.B. Rai, Ex. Head, ICAR-IIVR, Varanasi
	<b>AICRP(VC) Project Coordinating Cell, Varanasi</b>
8.	Dr. Jagdish Singh, Project Coordinator
9.	Dr. S.K.Verma, Pr. Scientist
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12.	Dr. R.N.Prasad, Pr. Scientist
13.	Dr.Sudhir Singh, Pr. Scientist
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15.	Dr.S.N.S.Chaurasia, Pr. Scientist
16.	Dr. N.Rai, Pr. Scientist
17.	Dr. S.K. Singh, Pr. Scientist
18.	Dr.Raghwendra Singh, Pr. Scientist
19.	Dr. Sudhakar Pandey, Pr. Scientist
20.	Dr. Anant Bahadur, Pr. Scientist
21.	Dr. Hara Krishna, Pr. Scientist
22.	Dr. R.K.Dubey, Sr. Scientist
23.	Dr. B.K. Singh, Sr. Scientist
24.	Dr. Jaydeep Halder, Scientist
25.	Dr. S.K. Tiwari, Scientist
26.	Dr. Pradip Karmakar, Scientist
27.	Dr. Manimurugan, Scientist
28.	Dr. Indivar Prasad, Scientist
29.	Dr. K.K.Gautham, Scientist
30.	Dr. Nagendran, Scientist
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34.	Dr. ShriDhar, Pr. Scientist
35.	Dr. T. K. Behera, Pr. Scientist
36.	Dr. H.Choudhury, Pr. Scientist
37.	Dr. R.K.Yadav, Pr. Scientist
38.	Dr.Praveen K.Singh, Pr. Scientist
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44.	Dr. M. Pitchaimuthu, Pr. Scientist
45.	Dr. B. Varalakshmi, Pr. Scientist
46.	Dr. S.Shankara Hebbar, Pr. Scientist
47.	Dr. T.H. Singh, Pr. Scientist
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50.	Dr.G.M.Sandeep Kumar, Sr. Scientist
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56.	Prof. C.B. Bachkar, Jr. Pl. Pathology
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60.	Dr. Neena Chawla, Professor
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62.	Dr. Sukhijit Kaur, Asst Nematologist
63.	Dr. Kulbir Singh
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86.	Dr.A.Ramar
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93.	Dr.C.Kavitha
94.	Dr.Vidya
95.	Dr.M.Nandakumar
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98.	Dr.S.K.Manoranjitham
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103.	Dr.K.B.Sujatha



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106.	Dr.Nagaraj
107.	Dr.Muralitharan
108.	Dr.Kumar
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111.	P.Ponni
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114.	T.Kumararaja
115.	M.K.Moorthy
116.	K.Suresh Babu
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214.	Dr.G.J.Janavi
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215.	Dr.Parkash Bhaskar Sanap
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216.	Dr.B.V.Tembhurne
217.	Mr.D.K.Dixit
218.	Dr. G. Keshavan,R&D,CBE
	<b>Professional Organization</b>
	<b>Ajeet Seeds</b>

219.	Dr.S.K.Kataria
	<b>Ankur Seeds</b>
220.	Dr.Manju Vishwakarma
221.	Dr.Bhupesh
222.	Dr.B.Deotale
	<b>Bharat Nursery Pvt.Ltd.</b>
223.	Dr. Asish Ghosh
	<b>Bejo Sheetal Hybrid Seed Pvt. ltd</b>
224.	Sh.Suresh O. Agarwal
225.	Dr.S.N.Singh
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226.	Dr. P.K. Singh
227.	Dr.M.K.Singh
	<b>Century Seeds</b>
228.	Dr.M.P.S.Mangat
	<b>East west Seeds</b>
229.	Dr.Sanjay Kumar Rai
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230.	Dr.B.K.Tripathi
231.	Dr.Umesh Singh
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232.	Dr.G.Hari Gopal Krishna
233.	Dr.N.P.Sharma
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234.	Dr.F.B.Patil
	<b>Maharastra State Seeds Corp.</b>
235.	Dr. K.S.Ravi
236.	Dr.S.Gupta
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237.	Mr. Kalyan B Hathe
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239.	Mr. M.B.Patil
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242.	Mr. B.Siva Nageshwar
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