

The Chairman Dr. H.P. Singh said that the model of PPP has already been formed by IARI and exchange of germplasm is a matter of policy making. He mentioned that the seeds can be provided by the public sector to private for further multiplication and sale, but in the label of the product, the source of the breeder's seed, need to be mentioned.

Dr. Anand, said that a policy needs to be framed regarding the sharing of f_3 , f_4 , f_5 breeding materials with the private sector in exchange of a cost.

XXIX-Workshop

Venue : J.A.U., Junagadh
Date : 27th -30th January, 2011

General Session

- The seeds of released varieties with distinguished characters and photographs must be deposited with the IIVR for maintenance breeding and NBPGR for long-term storage within one month and progress report to be submitted to council regularly by PC Cell.
- In germplasm evaluation emphasis to be given to understand phenology of the plants in different situations and locations by pooling of germplasm lines from different centres. In this context, focused trials to be initiated in the present scenario of climate change with the common set of lines for specific traits.
- Minimum yield level in each crop should be decided for acceptance of trial and yield data to be presented in tons/ha.
- For developing forecast model, data of 20 years on important pest and disease incidence to be compiled along with corresponding data on major abiotic factors.
- Common set of guidelines to be followed for reporting of data by each centre.
- Programme to be reoriented to develop climate resilient varieties for drought, temperature and humidity.
- Quality parameters e.g. lycopene, vitamin C etc. to be expressed.

Collection, Evaluation and Conservation of Germplasm

Table 1: List of promising germplasm available with different centers (2009-10)

Crop/Source	Notable/ Promising germplasm
Amaranth	
Jabalpur	Leaf and stem both purple- JAS-9 (65 g/pl)
	Leaf and stem both green- JAS-1 (14 g/pl.), JAS-3 (38 g/ pl.), JAS-5 (44 g/pl.), JAS-6 (30 g/pl.)
	Stem green and leaf purple- JAS-7 (49 g/pl.)
Bitter gourd	
IIVR	Yield (kg/pl.)- VR-101 (2.53) and VR-103 (2.41)
Bottle gourd	
IIVR	Long: Yield (Q/ha.)-VR-94 (430.0), VR-40 (419.0)
	Round: Yield (kg/pl.)-W-6-1 (20.458) and W-6-2 (16.987)

Crops/Source	Notable/ Promising germplasm
Cucumber	
IIVR	Yield and Earliness- VRC-11-2 (1.3 Kg/pl.) Max. fruit wt.- SPP-87 (176 g)
Rahuri	Yield/plot- Sel. 9 (26.125 Kg), Sel. 23 (23.470 Kg) Earliness: Sel. 3 (43 days), Sel. 11 & Sel. 15 (44.66 days), Sel. 17 (44.33 days), Sel. 23 (44.99 days), DC-6 (44.66 days) Fruit length: Max.- Sel. 9 (40 cm)
Palampur	Gynoecious line (Plp-Gy-1) Yield: 1.91 Kg/vine; Fruits/pl. - 8.92; Individual fruit wt. 214.67 g Fruit length 17.55 cm; Fruit girth 4.89 cm Duration of fruiting (44.25 days); First picking 30 days of seeding Nodal position of the 1st female flower 2.83 Days to female flower appearance 22.11
Pointed gourd	
IIVR	VR-1 (2.742 Kg/pl.), VR-2 (2.636 Kg/pl.), VR-3 (2.546 Kg/pl.)
Kalyani	Earliest fruiting lines (Days to 1st flowering- BCPG-9 (81), BCPG-15 (85) BCPG-5(85) Fruit Yield (q/ha) BCPG-3 (643.20), BCPG-4 (617.60) Fruits /plant- BCPG-16 (102), BCPG-3 (94.60) Downy mildew (Mini. Intensity%)- BCPG-13 (14.0) BCPG-10 (18.0) Vine & fruit Rot (Mini. Intensity%)- BCPG-16 (15.5), BCPG-13 (15.6)
Faizabad	Yield Q/ha. NP-801 (217.0) NP-260 (208.0), NP-504 (200.0)
Sabour	Yield Q/ha. - Rajendra Parwal-1 (164.25), Rajendra Parwal-2 (153.10) Fruit Length (cm)- Rajendra Parwal-1 (9.85); Sultanganj-2 or 94-2 and 2006-02 (7.25) Average fruit wt. (g): Rajendra Parwal-1 (38), 2008-02 (30)
Bhubaneswar	Yield/pl.- BPG-4 (1.015 Kg), BPGAN-02 (0.992 Kg), BPG 10 (0.892 Kg) Fruit Length (cm)- BPGAN-02 (6.96), BPG-4 (6.71) Fruit girth (cm): Max. - BPGAN -02 (4.19), BPG-4 (4.16)
Ivy gourd	
IIVR	Fruit Yield (kg/pl.) Long-VR-6 (2.148 Kg/pl.), VR-14 (2.113 Kg/pl.), VR-22 (2.101 Kg/pl.) Oval-VR-2 (2.135 Kg/pl.), VR-9 (2.412 Kg/pl.) ,VR-16 (2.141 Kg/pl.)
Raipur	Fruit Weight (g) Max. Acc. 48 (25.0), Acc.-52 (23.0) Earliness-Acc. 05, Acc. 06, Acc. 10, Acc.15, Acc.23, Acc. 34, Acc.35, Acc.36 (73 days)
Muskmelon	
IIVR	Yield (Kg/pl.)- VRM-5 (7.2) Fruits/pl. - VRM-02 (9.3) TSS-VRM-26 (14.7)
Ludhiana	Fruit wt. (g)- IC267379 (450-700), IC267397 (700-800), IC267357 (450) High TSS (% brix) - IC 267379 (8-10) Netted Type: IC 267379, MC2009-12
Rahuri	Yield (q/ha)-RHRMM-28 (257.28), RHRMM-15 (212.83) High TSS (% brix) - RHRMM-16 (12.0) and RHRMM-15 (11.0) Flesh colour Light Green- RHRMM-1, RHRMM-4, RHRMM-6, RHRMM-9, RHRMM-15 Orange- RHRMM-2, RHRMM-3, RHRMM-5, RHRMM-8, RHRMM-10, RHRMM-12 White- RHRMM-14 Netted Type: RHRMM-2, RHRMM-3, RHRMM-4, RHRMM-5 and RHRMM-7
Pumpkin	
IIVR	Yield : M-Local (8.8Kg/pl.) Fruit/plant : VRPK 230 (3.5) Fruit weight: VRPK-207 (7.5 Kg), VRPK-15-1 (6.2 Kg)

Crops/Source	Notable/ Promising germplasm
Coimbatore	Yield/Pl. (Kg): ACC 5 (11.11), ACC 9 (10.11) Flesh Thickness: ACC 3 (3.56 cm) Emergence of 1st female flower: ACC 13 (42.37 days), ACC 15 (44.62 days) Fruits/Plant: ACC 15 (4.75), ACC 8 (4.25)
Watermelon	
Ludhiana	Max. fruit wt. (Kg)- Watermelon-57 (4-6), Watermelon 59 (4) High TSS- Watermelon-56 (12-14%), Watermelon-57, Watermelon 58 and Watermelon-59 (11-12%) Flesh colour: Red (WM-56, WM-59) Deep Pink: (WM-57, WM-58)
Tomato	
Ludhiana	TSS: EC 654760 (5.2%), EC 654698, EC654699 and EC654710 (4%) Fruit wt. (g): EC 654698 (80), EC 654682 (70), EC 654699 (50), EC 654760 (40)
Brinjal	
IIVR	High yielding lines (Kg/plant)-IC90901 (1.65), IC2152 (1.52) Earliness (Days to harvesting): IC 545884 (64.54), CH-555 (69.56), IC 354547 (69.76)
Bhubaneswar Kalyani	High yielding lines (kg/plant)-BBSR-202 (1.882), BBSR 195-1 (1.70), BB26 (1.392) & SM6-6 (1.329) Yield/plant (Kg)-BCB-11 (1.6), BCB-30 (1.68) Earliness (Days to 50% flowering)-PB-67 (50), SH-BH-101 (50) Marketable Fruits/ plant- DBL -02 (12), HBL-25 (12)
Jorhat	Yield/ plant (kg)- BBSR-202 (1.882), BBSR-195-1 (1.710) Earliness (Edible days): SM6-6 (73), BBSR195-3 (75), BBSR-08-1 (76)
Chillies	
IIVR	Resistance to Anthracnose and PepLCV: Bhut Jolokia GMS lines: MS 12 and GMS 3
Kalyani	Earliness (Days to 50% flowering)-COB-3 (30.67), COB-10 (30.33) Capsacin (%) - BCC-12 (0.37), BCC-1 (0.31) Ascorbic Acid (mg/100g)- BCC 1 (221.18), AC 615 (150.02) Oleoresin (%): ACC588 (37.00), HP30 & COB 8 (31.17), Fresh yield/plant (g)- Chaitali pointed (272.79) & BCCH Sl.4 (221.10) Fruits/plant- BC CH Sl. 4 (134), Chaitali pointed (114.4)
Jorhat	Fresh Yield/ plant (g)- 10/KS-3 (370), 10/KS-4 (360) and 19/09(1) (320) Fruits/pl.- 10/KS-3 (193), 27/10 (148), 8(A)/09(1) and 6(A)/09 (146),
Lam	Oleoresin (%) -GP89 (14.51), GP82 (14.31) Capsanthin (EOA Color value)-GP299 (53375), GP132 (47672) & GP155 (45140) Capsacin (%) - GP276 (0.581), GP148 (0.571)
Coimbatore	Yield (Riped, g/pl.)-CA 197 (479.26), CA 166 (428.38), CA 25 (412.37) Fruits/pl.-CA 141 (140.8), CA 60 (400.93), CA 52 (99.6)
Paprika	
IIVR	Free From Leaf Curl Virus and Anthracnose (Under Field condition)-BS-35, Bhut Jolokia, MC334
Pea	
Ludhiana	Earliness (Days to 50% flowering) - Angoori (54), Vasundhara (55) Pods/ plant - Aryaveer (41.20) Seeds/ pod- Angoori (8.0)
IIVR	Yield/ pl.(g)-EC-269396(92), VRP290(86) Early maturity-VRP9414(40 days), EC93810 (45 days) Pods/ pl.- EC269396 (15), VRP290(13)
French bean	
Pantnagar	Green Pod Yield (q /ha)- FB25 (107.32), FB-23 & FB29 FB28(106) Earliness (50% flowering)- FB28(38.33) FB25(40.66)



Bhut Jalokia

Crops/Source	Notable/ Promising germplasm
Lab lab Bean	
IIVR	Green pod yield (Q/ha)- VRSEM-501 (310.0), VRSEM-6 (309.0) Days to 1st flowering -VRSEM-752 (45), VRSEM-201 (54) Pod Length (cm)-VRSEM-934 (15.57), VRSEM-946 (14.69)
Raipur	Days to 1st flowering -IS-32 (43), IS-21 (46) Green pod yield (Q/ha)-IS-02 (150.92) IS-11 (150.46) First harvest: IS-32 (60 days), IS21 (68 days)
Jabalpur	Days to 1st flowering -JDL-13(44.8), JDL-14(53.4) Pod yield/pl.(g)-JDL7(532), JDL3(528)
HARP	Yield (q/ha.)-HADB105 (352.92), HADB107(321.05) Days to 1st pod harvest- HADB119(68), HADB-120 & HADB-122(73) Pod length (cm)-IC249534 (14.67), IC20033 (14.33) Pods/pl.- EC305789 (210), IC249538 (206)
Okra	
IIHR	Yield/pl. (g): IIHR299(552.0) Fruits/pl.: IIHR299 (30.66), IIHR287(26.73) YVMV Free genotypes-IIHR296, IIHR294, IIHR299
Carrot (tropical)	
Hisar	Root length (cm)- Max.- HC-251-4(26.7), HC-1-1 & HC-251-3(26.2)
IIVR	Yield/Pl.(g) L18257(176), Super Red(173), L18245(165)
Ludhiana	Dark RED TC-10, C-2 Root Length(26)- Free from hairs Red color- TC-10, C-1 Root Length(30)- Small Core
Cauliflower (early)	
Sabour	Curd Size (Below 10cm)-Total Acc. 10 Curd Weight (g) 93-2(388), 2006-2(360), Samastipur RECF-2(426 g)
Cauliflower (mid)	
	Net Curd Weight (g)-Max.-96-5M (595), 2008-1M (590) Color of curd- White-94-2M, 96-5M, 99-1M, 2007-5M, 2008-1M Creamy white- 97-1M, 2001-5M
Cauliflower (late)	
	Yield (t/ha): Mukutmani-1(36.5) First harvest:-Hemantika(107)
Cabbage	
Solan	Yield (Q/ha): Coll. No. 8 (236) Net Head weight (g)-Max.-Coll. No. 8 (760)
Spine Gourd	
Kalyani	Fruit yield (Kg/pl.)-BCSG-1 (2.04), BCSG-2 (1.80) Fruits/plant- BCSG-1 (30), BCSG-2 (25) Earliness (Days to first flowering) -BCSG-4 (64)
Cow pea	
Raipur	Pole Type : ICP-1, ICP-3, ICP-4, ICP-6, ICP-7, ICP-8, ICP-9, ICP-11 Semi-pole Type: ICP-2, ICP-10, IC-P12 Bush Type: ICP-5

Table 2 : List of promising germplasm available with different centres (2010-11)

Crops/Source	Notable/ Promising germplasm
Amaranth	
IIHR	Yield (g): IIHR181(67.4), IIHR172(65) Leaf Number(Max.): IIHR141(50.3)
Coimbatore	Yield (g/10 pl.)-A155 (289.6), A159 (256), A56 (245)
Chillies	
SKUAS & T (Srinagar)	Yield ripe fruit (g/plant)-SH-KC-71 (590), SH-KC-70 (560) Fruits/plant- SH-KC-69 (86), SH-KC-70 (72) Fruit Length- SH-KC-70(10.32), SH-KC-71(10.31)

Crops/Source	Notable/ Promising germplasm
Amaranth	
IIHR	Yield (g): IIHR181(67.4), IIHR172(65) Leaf Number(Max.): IIHR141(50.3)
Coimbatore	Yield (g/10 pl.)-A155 (289.6), A159 (256), A56 (245)
Chillies	
SKUAS & T (Srinagar)	Yield ripe fruit (g/plant)-SH-KC-71 (590), SH-KC-70 (560) Fruits/plant- SH-KC-69 (86), SH-KC-70 (72) Fruit Length- SH-KC-70(10.32), SH-KC-71(10.31)
Capsicum	
SKUAS&T (Srinagar)	Fruit Weight (g/plant)-SH-SP-50 (755), SH-SP-52 (690) Fruits/plant- SH-SP-50 (13), SH-SP-52 (12)
Paprika	
SKUAS&T (Srinagar)	Red Ripe Fruit Weight (g/plant)-SH-P-48 (419), SH-P-49 (405) Fruits/plant- SH-P-48 (19), SH-P-46 & SH-P-49(18) Fruit Length(cm)- SH-P-48(11.02), SH-P-49 (10.56)
French Bean	
IIHR	Yield (T/ha): IC-525251 (17.18), IC-525241(16.14), IC-525228(15.88) Pod Length(cm): IC-525251 & IC-525263 (16.75) Days to Pod Maturity: IC-525285(44.5), IC-525243(44.5)
Carrot	
Srinagar	Yield(Q/ha.)-SH-C-155 (269.32), SH-C-157 (261.05) Root Length(cm)(Max.)- SH-C-157(15.26)
Cauliflower (Early)	
IIVR (Kunwari)	Kunwari Amrit Special (Max.)-(Curd wt. 750 g)
Kataki	HS-Kataki (Curd wt. 750 g)
IIHR	Curd Weight (g): IIHR426 (402.9), IIHR425 (385) Non-riceiness: IIHR409, IIHR-414, IIHR-415, IIHR-418, IIHR-425, IIHR-426, IIHR-441, IIHR-445
Cauliflower (Mid)	
IIVR	Curd weight (g): BSBV (1900), BSBV64 (1780)
Cowpea	
IIVR	Pod Yield /plant (g)- KPC11 (216.53), KPC-8 (174.75) & VRC-431(167.17) Longest & Heaviest pod :VRC-435(45.2cm & 11.3 g), VRC-431 (43.5cm & 11.0 g) Earliness (Days to 50% flowering)- VRC-431 (45), VRC-425(45.2) & VRC-429(45.5) Resistant to golden mosaic virus (Field): VRC-426, RGC-4 & KPC-10
IIHR	Yield (Pods/pl.(g)): IIHR114(500), IIHR114A (450) & IIHR104(400) Pod Length (cm): IIHR79 (63), IIHR91 (56) Earliness (Days to 50% flowering)-IIHR83(51), IIHR156(51) Pod length (cm) Max. -IIHR114A (87), IIHR114 (62) & IIHR85(44)
Periyakulum	Yield (t/ha): Acc.No.6(30.39) It is also expressing max. length (46.94 cm), Pod weight (23.87 g) & Pod yield/pl.(547.0 g)
Drumstick	
Periyakulum	No. of pods/tree: Acc. No.3(145), Acc. No.1(132) Pods Length(cm): Acc.No.-7(75), Acc No.1(71.65) Pod Weight(g): Acc.No.2(110), Acc. No.7(99.30)
Pointed gourd	
Bhubaneshwar	Yield/pl. (kg): BPG-4 (0.950), BPG AN-02 (0.920) Fruit Length (cm): BPG-4 (6.86), BPG AN-02 (6.81) Fruit Girth (cm): BPG-4 (11.5), BPG AN-02 (11.2)

Table 3: List of promising introductions available with NBPGR, New Delhi (2010-11)

Crops	EC No.	Country	Traits	
Cabbage	EC678826	CHINA	Heat tolerance	
Cauliflower	EC678824 -25	CHINA	Heat tolerance	
Watermelon	EC678820	TAIWAN	Heat tolerance, strong resistance to BW and blight and rainfall	
	EC678821	TAIWAN	Heat tolerance, resistance to BW and blight	
	EC678822	TAIWAN	Tolerance to heat, rainfall, BW and blight	
Chilli	EC668798, 668801, 668803, 668805, 668806, 668808, 668812, 668814, 692278, 692280	TAIWAN	A line	
	EC668799, 668800, 668802, 668804, 668807, 668813, 668815, 692279, 692281	TAIWAN	B line	
	EC668809	TAIWAN	R line	
	EC668810-11, 668816	TAIWAN	Restorer line	
	EC678809	CHINA	Fresh use, green, pungent, resistant to heat and humidity	
	EC673074	TAIWAN	Cayenne type	
	EC678805	CHINA	Dark green, strong pungent, heat and humidity resistance	
	EC678806	CHINA	Fresh use, plant height-80-90 cm, light green turn red and smooth	
	EC678807	CHINA	Fresh and dry use, green, high pungency	
	EC678808	CHINA	Fresh use, green smooth, high pungency	
	EC678809	CHINA	Fresh use, pungency, heat and humidity resistance	
	Tomato	EC671595-96	TAIWAN	TMV resistance
		EC671597-98	TAIWAN	TMV, FW-2 resistance
		EC675830	TAIWAN	BW, TMV resistance
EC675831, 833		TAIWAN	BW, TMV, FW1 resistance	
EC675832		TAIWAN	GLS, BW, FW1, TMV resistance	
EC675834		TAIWAN	TMV, LB, FW1, FW2, ST resistance	
EC675835		TAIWAN	GLS, BW, FW1, TMV, Gemini virus (Ty2) resistance	
EC675836		TAIWAN	TMV resistance	
EC678814-15		TAIWAN	Resistant to BW, virus and blight	
EC678817		TAIWAN	Resistant to low and high temp.	
EC678818		TAIWAN	Resistant to virus, leaf mould blight, RKN, long shelf life	
EC687094		TAIWAN	Resistant to TYLCV, determinate, shape oblong, size medium to medium large, green colour stem	
EC687095		TAIWAN	Resistant to TYLCV, square round, medium large, green stem, semi determinate	
EC687096		TAIWAN	Resistant to TYLCV, square round, medium size, green stem, determinate	
EC687097		TAIWAN	Resistant to TYLCV, determinate	
EC687098		TAIWAN	Resistant to TYLCV, shape round, size medium, purple stem, determinate	
EC687099		TAIWAN	Semi determinate, red colour fruit, oblong shape, resistant to TYLCV, TMV, FW1	
EC687099	TAIWAN	Semi determinate, red colour fruit, oblong shape, resistant to Gemini virus(Ty2),TMV, FW1		
EC687100	TAIWAN	Semi determinate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2),TMV, FW1		

Crops	EC No.	Country	Traits
	EC687101	TAIWAN	Semi determinate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2), TMV, FW1
	EC687102	TAIWAN	Semi determinate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2), TMV, FW1
	EC687103	TAIWAN	Semi determinate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2), TMV, FW1
	EC687104	TAIWAN	Indeterminate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2), TMV, FW1
	EC687105	TAIWAN	Indeterminate red colour fruit, oblong fruit shape, resistant to Gemini virus (Ty2), TMV, FW1
	EC687106	TAIWAN	Semi determinate orange colour fruit, glove fruit shape, resistant to TMV, BW, FW1
	EC687107	TAIWAN	Indeterminate orange colour fruit, oblong fruit shape, resistant to TMV, BW, FW1
	EC687108	TAIWAN	Indeterminate orange colour fruit, oblong shape, resistant to TMV, BW, FW1
	EC690981	TAIWAN	Uniform shoulder, square round shape, semi determinate type, homozygous for resistance for Gemini virus (TY-1, TY-2, TY-3), FW2 and TMV
	EC690982	TAIWAN	Uniform shoulder, square round plum, determinate, homozygous for resistance Gemini virus (TY-1, TY-2, TY-3), FW2 and TMV
	EC690983	TAIWAN	Green shoulder, homozygous for resistance Gemini virus (TY-1, TY-2, TY-3), and TMV, homozygous allele susceptible to FW2
	EC690984	TAIWAN	Green shoulder, oblong, semi determinate, homozygous allele resistance for Gemini virus (TY-1, TY-2, TY-3), FW2 and TMV
	EC690985	TAIWAN	Green shoulder, oblong shape, determinate, homozygous allele resistance for Gemini virus (TY-1, TY-2, TY-3), FW2 and TMV
	EC690986	TAIWAN	Uniform shoulder, square shape, semi determinate, homozygous allele resistance for Gemini virus (TY-1, TY-2, TY-3), FW2 and TMV
	EC690990	TAIWAN	Uniform shoulder, plum square-oblong shape, determinate type, homozygous allele resistance for Gemini virus (TY-2, TY-3), and TMV
	EC692274	TAIWAN	Resistant to gray leaf spot, BW, FW1, TMV and <i>begomo</i> virus, heat tolerance
	EC692275	TAIWAN	Resistant to BW, FW1, TMV and heat tolerance
	EC692276	TAIWAN	Heat tolerant, fruit large size and globe shaped
	EC692277	TAIWAN	Resistant to FW2, gray leaf spot and early blight

Vegetable Production

Based on the three-year data following recommendations were emerged:

IPNM

- 1 At Junagadh, the maximum yield (253.17 q/ha) along with highest C:B ratio 1:2.57 in tomato was recorded with the application of FYM@10 t/ha + *Azotobactor* + recommended dose of NPK (120:60:80 kg/ha).

- 2 The maximum yield (286.84 q/ha) along with highest C:B ratio (1:4.62) was obtained in crop of carrot at Jabalpur centre with the application of FYM @ 10 t/ha +1/2 NPK (30:40:37.5 kg/ha) + Biofertilizer.
- 3 At Durgapura, the maximum yield (116.25q/ha) along with highest C:B ratio (1:2.79) in cowpea cv. RCV-7 was recorded with the application of poultry manure @2.5 t/ha +1/2 NPK (12.5:20:20 kg/ha). Hence, it is recommended for Durgapura conditions of Rajasthan.



Field View of Cowpea RCV-7 Durga Kranti- ARS, Durgapura

Micronutrients

- 4 At Srinagar, the maximum yield (246.04 q/ha) along with highest C:B ratio (1:1.99) in broccoli cv. Fiesta was obtained with the application of all the micro nutrients (B, Zn, Mo, Cu, Fe and Mn).
- 5 At Junagadh, recommended dose of NPK (75:37.5:62.5 kg/ha) +foliar sprays of the mixture of all the micro nutrients gave maximum yield (263.96 q/ha) as well as highest C:B ratio (1:1.67) in tomato. Hence, it is recommended for Junagadh condition of Gujarat.

Organic Farming/Cropping Sequences

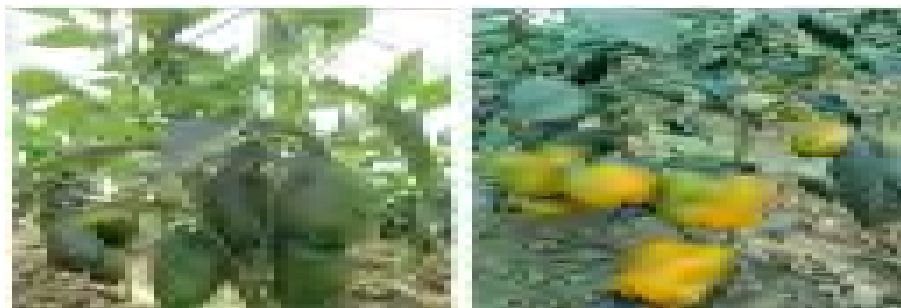
- 6 At IIVR, under okra -tomato-cowpea cropping sequences the maximum yield (145.89 q/ha) along with C:B ratio (1:2.04) in okra was recorded with the application of vermicompost @ 2.5 /ha + VAM + Pseudomonas+Trichoderma +Azotobactor . The same treatment gave yield (359.5 q/ha) of tomato. Under the same field without application of any additional dose of nutrient the maximum yield of cowpea was recorded i.e. (152.2 q/ha). Hence this treatment is recommended for obtaining the maximum yield and net return in okra-tomato-cowpea cropping sequences in Varanasi condition of U.P.

Vermiwash

- 7 At IIVR, the soil application of vermicompost @ 5 t/ha +4 foliar sprays of vermiwash at 10 days intervals after 30 DAT gave maximum yield (668.95 q/ha) of tomato cv. Sartaj along with C:B ratio (1:5.53). Hence, it is recommended for Varanasi conditions of U.P.

High Value Crops

- 8 At IIVR, the maximum yield (163.5 q/ha) along with the highest C:B ratio (1:5.67) in green fruited capsicum grown under protected conditions was recorded with pinching. Hence, it is recommended for cultivation of capsicum under protection condition.



Capsicum grown under protected condition

Varietal Trials

The data for the year 2007-08, 2008-09 and 2009-10 was thoroughly scrutinized by the committee and the following 07 entries of 04 crops were identified for release and notification.

Table 4: List of the varieties of vegetables identified

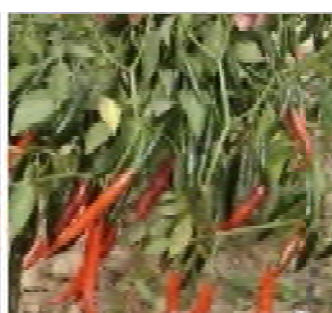
Crop	Entry	Source	Zone recommended
Tomato (Indeterminate)	PAU-2372	PAU, Ludhiana	I
Tomato (Determinate)	ATL-01-19	Anand	VI
Chilli	VR-338	IIVR, Varanasi	II
	ACS-06-2	Anand	VIII
Cowpea (Bush)	VRCP-6	IIVR, Varanasi	IV
	Ankur Gomti	Ankur Seeds	V
Ash gourd	KAG-1	Kanpur	VIII



PAU-2372



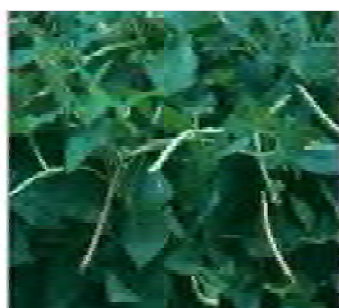
ATL-01-19



VR-338 (Kashi Gaurav)



ACS-06-2



VRCP-6 (Kashi Nidhi)



Ankur Gomti



KAG-1

Physiology, Biochemistry and Processing

Physiology

- The trial on 'Effect of genotype and planting time on growth habit and productivity of tomato' was carried out for plant biomass, leaf area, fruit filling rate and potential fruit weight. Initial leaf area was highest in Area Ashish (30652 sq.cm.). Around 50% flowering was earlier by 4 days in Arka Ashish compared to PF-4A.
- Under biochemistry trials, IIHR, Bangalore and PAU, Ludhiana had conducted the trials for estimation for antioxidant component in tomato, pumpkin, bitter gourd and muskmelon. The trial was not conducted by the IIVR due to the selection of Bio-chemist as HOD, IIPR, Kanpur. At reported centres, tomato, pumpkin, bitter gourd and muskmelon were taken for the study.
- The result at IIHR indicated that vitamin C content was higher in H 248 and cv. Laxmi of tomato

and lower content of vitamin C was noted in the line 241. The TSS was significantly higher in H-240. The rest of the varieties had the values ranging from 2.8 to 3.7° Brix. at IIHR. While at Ludhiana centre, studies were conducted on tomato, pumpkin and muskmelon. Antioxidants, vitamin C, carotenoids were estimated in pumpkin. Lycopene and acidity content were recorded in tomato. In muskmelon, TSS, acidity and vitamin C content were estimated.

- In pumpkin, maximum (14.99 ml./100g) vitamin C content was recorded in P. Samrat and maximum (9.44 ml/100g) carotenoids content was noted in pumpkin genotype 1110-221.
- In muskmelon, maximum (10%) T.S.S. was recorded in muskmelon genotypes P.A. and maximum (17.29 mg 100 g.dm) vitamin C content was reported in the genotype M
- At PAU, Ludhiana 42 genotypes of chillies at red stage were analysed for dry matter, capsicum content, colouring matter (ASTA units). The maximum (0.91%) capsaicin content was noted in chilli genotypes 09/CHIHBY-11. However, maximum (36%) dry matter was recorded in chilli genotypes 01/ChI var1. 51 x golden melon.

Post harvest processing

- At IIVR, Varanasi, lycopene development in tomato fruits at 3 maturity dates, i.e. turning, breaker and ripe stage was carried out with CRD design in three replications. The estimation was carried out for PLW%, TSS, acidity, lycopene and vitamin C content. The harvested tomatoes at turning stage had minimum PLW and maximum at ripe stage of the harvest of tomato in both the OP and hybrids. The mean lycopene development after ripe stage of harvest was maximum (3.95 mg/100 gm) in OP variety, Kashi Hemant whereas hybrid variety IIVR HYB-4 had maximum (3.92 mg/100 gm) lycopene at ripe stage of harvest and subsequent storage.
- At PAU, Ludhiana two varieties of tomato Pb. Upma and Pb. Chuhara were harvested at turning, pick and red stage. The results were recorded for dry matter, TSS, acidity, lycopene, carotenoids and vitamin C content.
- At IIHR, Bangalore 4 hybrids such as Arka Ananaya, H-162, H-240 and H-241 of tomatoes were harvested at all the 3 stages. Data were recorded on development of colour, TSS, dry matter, acidity, vitamin C, lycopene and total carotenoids.
- At PAU, Ludhiana, sweet pepper hybrid Indra was harvested at optimum maturity stage and packed in different packaging materials such as HDPE, shrink film, corrugated card board boxes and plastic crates at room temperature and refrigerated conditions. The results were recorded for spoilage (%), PLW (%) and vitamin C content.

Packaging materials

- At IIHR, tomato hybrid (NS-2535) at turning stage was harvested and packed in CFB boxes, plastic crates and wooden boxes. Samples were analysed for TSS, vitamin C, lycopene and acidity content.
- At IIVR, Varanasi, OP and hybrid tomatoes and capsicum variety were packed in CFB boxes, jute bags, plastic crates, perforated and non-perforated polypropylene pouches. The observations were recorded on PLW (%), colour, TSS, lycopene and sensory attributes during storage at room temperature, while capsicum was packaged in the aforesaid packaging materials and were stored at room temperature and refrigerated storage temperature for shelf life studies.

Hybrid Trials

The committee thoroughly scrutinized the data for the year 2007-08, 2008-09, and 2009-10 and the following entries were identified for release and notification.

Table 5: List of hybrids identified among different vegetables

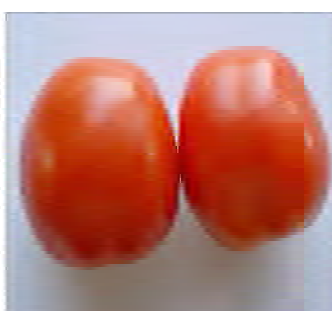
Crop	F ₁ hybrid	Source	Zone recommended
Brinjal Long	DBHL-20	IARI	IV
Brinjal (Round)	EPH-178	Syngenta	IV
Tomato (Indeterminate)	ARTH-2104	Ankur Seeds	IV
Chilli	HH-41786	Syngenta	VII



DBHL-20



EPH-178



ARTH-2104



Chillies-HH-41786

Insect Pest Management (2011-12)

- At Anand centre, Integrated module consisting of seed treatment with thiamethoxam 70 WS @ 3 g/kg seed and foliar spray of neem formulation @ 3 ml/lit at 40 DAS, endosulfan (1 ml/lit) + neem formulation @ 3 ml/lit at 50 DAS, spinosad 45 SC @ 0.3 ml/lit at 60 DAS, *Bt* formulation @ 2 ml/lit at 75 DAS and neem formulation @ 3 ml/lit 85 DAS is effective in management of jassid and shoot and fruit borer in okra and recorded higher fruit yield
- Two sprays of profenofos @ 2ml/l at 20 and 30 DAT and 3 sprays of Ha.N.P.V.@350LE/ha at 10 days interval from flowering or initiation of infestation is found to be effective in management of thrips, leaf miner and fruit borer of tomato and recommended under Rahuri conditions.
- Seed treatment with thiamethoxam @ 5g/kg prior to sowing and four to five rounds of spray of neem oil @ 1% mixed with sticker / teepol @ 0.5 ml/lit at 10 days interval starting from 35 days after transplanting was proved effective and recommended in controlling thrips and mites in chilli in Anand conditions.
- Seed treatment with thiamethoxam @ 5g/kg and four alternate foliar sprays of neem seed powder extract (NSPE) @ 5 % and fipronil @ 1.5 ml/L at 15 days interval starting 20 DAT was best in reducing the thrips infestation in chilli and recorded higher yield and is recommended under Bangalore conditions.
- Seed treatment with thiamethoxam @ 3 g/kg seed followed by 3 sprays of NSKE 4% at 10 days interval from 20 DAS was effective and recommended for the control of red pumpkin beetle and leaf miner infesting bottle gourd in Anand conditions.
- IPM module comprising of crop sanitation by removal of early infested fruits, installation of cue-lure baited bottle trap at the middle of two sub-plots in the central row and bait spray @ molasses 10% + malathion 50 EC (0.2%) at 6 spots in two border rows in four corners at 5 days interval from flowering in bower system was effective in controlling fruitfly in bitter gourd and gave higher income at Anand centre.

Disease Management

- The combination of IDM components like incorporation of FYM @ 25 t/ha, green manuring with soil application of *Sesbania*, seedling root dip and soil drenching with PGPR (*Pseudomonas fluorescens*), maintaining planting distance (50 cm x 45 cm), management of drainage by making gradual slope

and liming in acid soil controlled and harvested the yield of tomato (366.4 q/ha) with C.B. ratio of 1:2.97 and recommended for Bhubaneswar conditions for the management of bacterial wilt of tomato.

- Adoption of bower system and seed treatment with Metalaxyl 8 % + Mancozeb (64 % WP) @ 4 g/kg seeds + three times removal of old leaves in the morning and three sprays of Mancozeb (75 % WP) @ 0.2 % in the afternoon at 45, 55 and 65 DAS for economic and effective control of downy mildew disease in ridge gourd and recommended for Junagadh conditions.
- Ludhiana has concluded the trial veg 8.6 with the recommendations that the seed treatment with Ridomil MZ 0.25 + 3 times removal of lower infected leaves in the morning and spray of Mancozeb @ 0.25 % in the afternoon for management of downy mildew of cucumber grown in both conventional and bower systems.
- In Sabour condition seed treatment with carbendazim @ 0.25 % + raising seedlings in solarised beds and application of green manure @ 20 t/ha + neem cake 5 q/ha + *Trichoderma* 2.5 kg/ha found effective in controlling the management of collar rot/root of cabbage as well as enhancing the yield 348.76 q/ha.
- Seed treatment with *Trichoderma* @ 10 g/kg seed, + application of *Trichoderma* @ 2.5 kg in 500 kg FYM /ha + drenching with *Trichoderma* 10 gm/lit of water @ 1000 lit/ha at 15 DAS for the effective management of *Rhizoctonia* root rot in okra at Junagadh condition.

At the end the Chairman concluded the session with following remarks.

- The presentations should be classified into different major groups *viz.*, survey and surveillance of vegetables diseases, epidemiology, fungal, bacterial and viral disease management and accordingly the group presentation should be made.
- All the disease management trial results should be accompanied by C:B ratio and yield (tonnes/ha)
- Early blight (*Alternaria solani*) disease forecasting model developed by Dr. P. Chowdappa, IIHR should be tested and validated across the centres
- Disease management trials especially for *Fusarium* and *Ralstonia* wilts should be laid down in sick plot(s)
- Basic studies should be conducted to identify the reason behind the non effectiveness of many recommended fungicides against early blight of tomato and all the centres are requested to send *Alternaria solani* cultures to Dr Chowdappa for further studies.
- The disease management trials *viz.*, Veg 8.5, Veg 8.6 and Veg 8.7 should be concluded with recommendations as these trials have been conducted for five years
- To develop the disease forecasting model(s) in the important vegetable diseases Dr P. Chowdappa, IIHR has been identified as nodal officer. Four centers i.e IIHR, Bangalore, IIVR, Varanasi, BCKV, Kalayani, and PAU, Ludhiana have been identified for development of disease forecasting model for early and late blight of tomato. Automated weather station has to be provided through Project Co-ordinator to IIVR, Varanasi, BCKV, Kalayani and PAU, Ludhiana for carrying out the experiment
- Since late blight disease in tomato is emerging severely, the infected tomato samples need to be sent to IIHR, Bangalore and CPRI, Shimla for diversity analysis

Seed Production

- F₁ hybrid seed production in tomato would require a minimum isolation distance of 150 metres under open field conditions at Ludhiana.

- Pea seed treatment with polymer + imidacloprid 1% could store it for 16 months without affecting the seed quality as per trials conducted at Varanasi.
- Treatment of cowpea seeds with Spinosade 2 ppm was found to have minimum insect damage during ambient storage condition without affecting the quality of seeds upto 15 months under Raipur conditions.

Breeder Seed Production and Price Review

Table 6: Revised breeder seed rate of important vegetables

S. No.	Vegetable	Existing Rates (Rs./kg)	Revised Rates (Rs./kg)
1.	Palak	100	120
2.	Methi	110	130
3.	Okra	220	260
4.	Tomato	1540	1820
5.	Brinjal	720	860
6.	Chilli	770	920
7.	Capsicum/Paprika	2200	2640
8.	Cowpea	150	180
9.	Cluster bean	110	130
10.	French bean	170	200
11.	Dolichos bean	170	200
12.	Garden pea	110	130
13.	Early/Mid-early/Mid Cauliflower	1100	1320
14.	Late Cauliflower	2750	3250
15.	Cabbage	720	860
16.	Knol Kohl	440	530
17.	Radish	330	400
18.	Carrot	440	530
19.	Turnip	280	340
20.	Onion	660	790
21.	Bottle gourd	390	470
22.	Bitter gourd	500	600
23.	Sponge gourd	390	470
24.	Ridge gourd	390	470
25.	Cucumber	880	1060
26.	Tinda (Round melon)	220	260
27.	Pumpkin	500	600
28.	Muskmelon	550	660
29.	Water melon	600	720
30.	Coriander	110	130
31.	Amaranthus	220	260
32.	Long melon	420	500

The revised prices after approval of the Council will be circulated by Project Coordinator, AICRP-VC to all the centres who are producing breeder seeds under the national seed chain. At the end of the session, the following observations emerged:

- All the centres taking up breeder seed production should report the total actual quantity of seed produced for respective crops latest by 15th November every year.
- The PC requested all the centres to provide 2 to 3 varieties of each crop along with photographs which may subsequently be compiled region-wise and can be circulated to all State Departments,

Director Horticulture/Director Agriculture/Private Companies and also put on the website of IIVR/AICRP-VC.

- The extra quantity of seeds produced can be given to State govt. agencies based on their requirement / indent.
- Regarding lifting of seeds, some policies should be devised and a part of total cost of indented seed may be given in advance.
- Time period can be fixed for lifting the seeds, after that it may be disposed to other users as per the requirements.

Resistant Varietal Trials

The data for the year 2007-08, 2008-09 and 2009-10 was thoroughly scrutinized by the committee and the following 02 entries of okra were identified for release and notification.

Table 7: Resistant varieties identified

Crops	Entries	Source	Recommended zones
Okra	VRO-22	IIVR, Varanasi	IV
Okra	JOL-2K-19	JAU, Junagadh	V



VRO-22 (Kashi Kranti)



JOL-2K-19 (GJO-3)

Public-Private Interface

- The chairman urged the members from private sector to come up with the problems in dealing with public sector institutions. The Chairman said that an exchange of seed materials between public and private sectors is the need of the hour so as to bring about synergy in vegetable research, to enhance the efficacy of the agricultural system and to provide answers to the farming community of the country. He advocated the need to establish faith among each other and good understanding for effective functioning of Public Private Partnership (PPP).
- Dr. Cheema emphasized on two-way exchange of germplasm and breeding material among private and public institutions and also clarified the concern of private seed companies regarding reservations of public sector breeders. He emphasized on the need for problem oriented collaborative research projects funded by private seed companies.
- Dr. Sadashiva highlighted the role of Institute Technology Management Committees in ICAR institutes in germplasm registration, publicizing the technologies developed by the institutes and their licensing to private companies through MTA and MoU. He advocated the exchange of advance breeding lines and parental lines of hybrids for their effective utilization in vegetable improvement in the country.

- Dr. B. Singh informed the house about the status of hybrid developed by private seed companies tested under AICRP (VC) and also about the work of ITMU at IIVR, Varanasi.
- In his concluding remark, the Chairman advocated the use of modern techniques like DNA Fingerprinting to protect breaching of the parental lines and other breeding material and re-emphasized on need of Public-Private Partnership.

Plenary Session

- Dr. B. Singh, Project Coordinator, AICRP (Vegetable Crops) advised to record and send the Meteorological Data for proper assessment of the impact of climate change on the vegetable production in different agro-climatic Zones of the country.
- Chief Guest. Dr. N.C. Patel invited the attention of workers towards the need of efficient water management in crop production in general and in vegetable cultivation in particular. He also advocated to evolve the technology for uninterrupted supply of vegetables in urban areas through poly house production.
- In the concluding remarks, Chairman, Dr. U.C. Srivastava, suggested that proposal for notification of the identified varieties should be submitted well in time and it should also be registered in Biodiversity Authority of India in order to protect IPR issues.

XXX-Workshop

Venue : Govind Ballabh Pant University of Agriculture & Technology, Pantnagar
Date : 13th - 16th January, 2012

General Session

General Session on Action Report on the XXXth Group Meeting of AICRP (Vegetable Crops) was chaired by Dr. H. P. Singh, DDG (Horticulture). Action Taken report was presented by Dr. B. Singh, Project Coordinator, AICRP (Vegetable Crops). Under this session, following important decisions were taken by the house.

Distinguish characteristics with photograph of released and notified varieties must be deposited with PC Cell.

It was suggested by the Chairman Dr. H.P. Singh, DDG (Horticulture) that Centers which have not yet provided the information on varietal characteristics and photographs etc. they once again be requested to submit the information. In this context, if needed, Council will draft D.O. letter to concerned universities, ICAR Institutes for furnishing the information.

Minimum yield level in each crop should be decided for acceptance of trial

The Chairman, expressed concern over the low yield reporting from the experimental plots by the centres. He advised that trial should be properly monitored and properly managed so that full potential of the entries/ hybrids may be realized. Inviting the opinion of the house, it was decided to agree upon the minimum yield of all the vegetables taken under AICRP programme, Minimum yield fixed during the discussion will be communicated to all the centers.