XXVII-Workshop

Venue : TNAU, Coimbatore

Date : 12th – 15th Feb., 2009

Collection, Evaluation and Conservation of Germplasm

Table 1: List of promising germplasm available with different centers (2007-08)

Crops/Source	Notable/ Promising germplasm
Amaranths	
Jabalpur	Yield/plant (g)- JAS-1 (210.0) and JAS-3 (175.0)
Bitter gourd	
Vellanikkara	Earliness/Days to first harvest-VKB-177 (67 days) Yield (kg/plant)-VKB-176 (2.750) and VKB-175 (1.350)
Bottle gourd	
Faizabad	Earliness- BG-5011, BG-5016, BG-5031, BG-5035 and BG-5041
NBPGR	Earliness: IC117715, IC339206, IC382188
Cucumber	
Pantnagar	Earliness/Days to first female flower emergence- PCUC-21 (44 days) Yield (Q/ha.)- PCUC-11(340.0) and PCUC-21 (335.0) Resistance to Red Pumpkin beetle- PCUC-4, PCUC-6, PCUC-7, PCUC-14, PCUC-16
Rahuri	Earliness (Days to 50% flowering)- Surabhi (34.80) Yield/plant (kg)- Surabhi (2.67), MLKP-1 (1.46) Bitter less- SNG-5, KOP-1, KOP-2, MLKP-1 and Surabhi
Pointed gourd	
Kalyani	Earliest fruiting lines (Days to 1st flowering-BCPG-7 (97), BCPG-16 (101) BCPG-1(102) Fruits /plant- BCPG-16 (222.57), BCPG-14 (155.90) Downy mildew (Mini. Intensity%)- BCPG-13 (11.8) BCPG-10 (15.0) Vine & fruit rot (Mini. Intensity%)- BCPG-13 (8.50) BCPG-10(10.0)
Sabour	Yield (q/ha)- Rajendra P – 1 (180.78), Rajendra P – 2 (172.25)
Jorhat	Yield (q/ha)- AAUPG-1 (112.00), AAUPG-5 (103.20)
Bhubaneshwar	Fruit weight (g)- DR/PKP/AN-02 (33.0) and BPG-4 (32.8)
Muskmelon	
IIHR	High TSS (brix) –IIHR-131 (13), IIHR-132,IIHR-134 and IIHR- 138 (11) Fruit Weight (g)-IIHR-132 (810) Earliness (First Female flower emergence)- IIHR-131 (40)
Ludhiana	Entry14546306- weight 800g flesh thick light orange, TSS- 8 % Entry14546311- weight 850g thick flesh and creamy, TSS 12% Entry14546318- weight 900g thick flesh and light orange, TSS 16% Entry 14546236- weight 800g, thick flesh and salmon orange, TSS 11%
Rahuri	Yield (q/ha)-RHRMM-23 (188.27), RHRMM-1 (183.02) High TSS (brix) - RHRMM-10 and RHRMM-16(11.5)
Pumpkin	
Faizabad	Earliness (Days to first female flower emergence)-NDPK-5012, NDPK-5047, NDPK-5048 and NDPK-5051 Yield- NDPK-5040 and NDPK-5029-2 (Individual fruit weight 8-10 kg and tolerance to CMV)

Crops/Source	Notable/ Promising germplasm
Water melon	
Ludhiana	Market collection 2007-six- Fruit green striped skin weighing about 2000 g. Flesh is dark red sweet with high TSS (10%) and small seeds
IIHR	Earliness (Days to first female flower emergence)-IIHR-61 (43) Yield (kg/ plant) and TSS-IIHR-60 (15.0, 14%),IIHR-68 (14.0, 10%) Fruits/plant- IIHR-66 (6)
Tomato	
Coimbatore	Yield/plant (kg) and Fruits/plant-LE-231(2.868, 68.6), LE-1150 (2.485, 68.6) Earliness (50% flowering)-LE-477 (54.2) and LE-598 (54.4)
Pantnagar	Yield (q/ha.)-EC-519806 (699.0) and EC-519697 (695.0) TSS-EC519796 (6.48), EC519812 (6.19)
Jammu	Yield (q/ha)-HT-6 (317.69), HT-15 (285.31) TSS- HT-3 (6.10), HT-15 (5.55) Fruits/plant- HT-3(209.5), HT-4 (167.5)
Ludhiana	Rin T3- Non ripening, semi determinate, moderate foliage and fruits are flat round line (obtained from University of California Davis) EC 521049- Determinate, fruits are medium size and round, average fruit weight of 40-50 g (NBPGR)
Brinjal	
IIVR	Yield/plant (kg)-IC354623 (5.900), IC 089888 (5.100), IC137739 (3.800) Fruits/plant-IC074242 (45), IC137739 (43)
Kalyani	Earliness (Days to 50% flowering)-Pb. Sadabahar (47), SH-BH-101 (47.67) Yield/plant (kg)-BCB-11 (1.59), Pb.-67 (1.55) Fruits/plant-BB-85 (12), HBL-25 (11.33)
Bhubaneshwar	Tolerant to bacterial wilt- IC-090130, IC209306, IC345746 and 6G Earliness (Days to 50% flowering)- IC099703 (63), IC343008 (64) Tolerant to bacterial wilt- BBSR-192, BBSR-118, BBSR-200, BBSR-114, 114-1 Earliness (Days to 50% flowering)-BBSR-192 (69), BBSR-118 and BB-55 (71)
Vellanikkara	Resistant to Bacterial wilt-VKBr-26, VKBr-31, VKBr-52, VKBr-18, VKBr-29, VKBr- 4-2, VKBr-5-1, Swetha, Surya and Haritha High yielding lines (kg/plant)-Swetha (3.95) and VKBr-18(3.500)
Chillies	
IIVR	Yield/plant (g) (Red fruit)- EC587052 (800) Fruits/plant- EC587013 (30), Ec587007 (28)
Dharwad	Yield /plant (g) IC01DCS-06-01 (163.15), EC28DPS-06-01 (124.29) Fruits/plant- EC28DPS-06-01 (46), EC20DPS-06-01 (43) Longest Fruit (cm)- IC12DCS-06-02 (12.0), IC13DCS-06-01 (11.99)
Jorhat	Fresh Yield/plant (g)- Acc.7 (402.0), Acc.1 (380.0) Earliness (Days to 50% flowering) Acc.3 (63), Acc.2 (74.6) Fruit length (cm)-Acc.8 (7.5), Acc.5 (6.6)
Kalyani	Fresh yield/plant (g)-Chaitali pointed (320.4), HP-25 (268.2) Earliness (Days to 50% flowering)-HP-33 (33.77), HP-25 (45.27) Disease incidence -Leaf curl- ICPN-4 (0), ICPN-1,2, and 9 (5%) Dieback-ICPN-1, 5 and 8 (10%)
Coimbatore	Yield /plant (g) Red Ripe- CA 25 (332.2), Ca-06 (319.0) Fruits/plant- ALS-98-8 (132), CA-141 (125.3) Fruit length (cm)-Pant-5 (9.41), CA-17 (9.25)

Crops/Source	Notable/ Promising germplasm
Cho-cho (*Sechium edule*)	
Jorhat	Yield/plant (kg)-Line-1 (65.0), Line-5 (60.3) Fruits/plant-Line-4 (161) Line-5 (155)
Paprika	
Dharwad	Dry fruit yield (t/ha)-BD-16 (1.33), D-20 (1.09) and BK-21 (1.06) Green yield/plant (g)-BK-6 (275.33), BK-26 (242.44) Fruits/plant-D-20 (78.78), Bk-26 (70.00) Fruit length (cm)-Bk-6 (14.98), Bk-7 (13.52)
Pea	
Ludhiana	Early line (Days to 50%Flowering) – GP-3 (37), GP-1 and GP-5 (40) Pods/plant – GP-1 (10-11), GP-2 (9-10)
Solan	Green pod yield (q/ha)-NC-60953 (48.50), NC-60950 (45.30) Resistant to powdery mildew-IC-311061, NC-60950
Jammu	Green pod yield/ha (kg)-BL-8 (350.30), AP-1 (278.87) Shelling (%)-CPS-05-02 (54.71) CPS-05-04 (51.75) Pods/plant -CPS-05-06 (43), AP-1 (42.5) Days to 50% flowering- AP-1 (40.5), Bonn (41.5)
French bean	
Dharwad	Green Pod Yield (t/ha)- DWD-FEB-57 (8.53), DWD-FEB-53 (8.44)
Pantnagar	Green Pod Yield (q /ha)-PGR-FB-46-07 (48.3), PGR-FB-37-07 (40.32) Pods/plant-AC-14 (15.4), AC-6 (15.0) Earliness (Days to 50% flowering) PGR-FB-37-07 (56), PGR-FB-27-07 (57) Edible fruit maturity (Days) PGR-FB-37-07 (67), PGR-FB-22-07 (68) Bush type- PGR-FB-37-07, PGR-FB-46-07, PGR-FB-25-07, PGR-FB-23-07 Pole type- PGR-FB-33-07, PGR-FB-27-07
Momordica dioica* & *M. cochinchinensis	
Jorhat	Fruit yield (q/ha)- AAUSG-1 (75.5), AUSG-4 (70.4) Fruit weight (g)- AAUSG-1(88.3), AAUSG-3 (83.0) Days to first flowering- AAUSG-2 (61), AAUSG-4 (64)
Bhubaneshwar	Fruit yield/plant (kg) BSG-3 (0.805), BSG-4 (0.638) Days to first female flowering- BSG-4 (53), BSG-3 (54)
Kalyani	Fruit yield (q/ha) BCSG-1 (190.3), BCSG-2 (168.0) Days to first flowering- BCSG-1 (57) BCSG-2 (62) Fruits/plant BCSG-1 (63), BCSG-2 (60)
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)
HARP	Green pod yield (q/ha)-HADB-105 (484.5), HADB-110 (476.0) Days to 1st pod harvest- HADB-113 and HADB-114 (56) Pod length (cm)-HADB-107 and HADB-108 (12.83)
Jabalpur	Pod yield/plant (g)- JDL-9 (655.0), JDL-8 (615.0) Days to 50% flowering - JDL-18 (40) JDL-19 (45) and JDL-20 (460) Pod length (cm)-JDL-2 (15.5), JDL-5 (14.8)

Crops/Source	Notable/ Promising germplasm
Okra	
Bhubaneshwar	Fruits/plant-BBSR-35 (6.2), BBSR-16 (6.0) Fruit length (cm)-BBSR-35 (17.2) and BBSR-13 (16.3)
Carrot (Tropical)	
IIVR	Root length (cm)-Sel. 80 and Golden Rosy (25.0) Root weight (g)-DARL-1202 (200), Agra Sel.-2 (160.0)
Ludhiana	Long root, Dark Red, Blunt end, Juicy, small core
Hisar	Red Type-Root length (cm)-HC-251 (23.1), BC-1 (21.0) Root weight (g)- HC-160 (152.0), HC-1-2 (141.0)
	Purple type-Root length (cm)-HCP-227 (22.7), HCP-170and HCP-183 (19.4) Root weight (g)-HCP-171 (110.2), HCP-226-2 (110.0) Root length (cm)-HCY-183 (20.2), HCY-4-1 (19.2) Root weight (g)-HCY-1-1 (108.2), HCY-4-1 (94.3)
	Yellow type- Root length (cm)-HCY-183 (20.2), HCY-4-1 (19.2) Root weight (g)-HCY-1-1 (108.2), HCY-4-1 (94.3)
	Black type- Root length (cm)-HCB-1-2 (20.9), HCB-1 (20.4) Root weight (g)-HCB-1(114.0), HCB-1-2 (109.0)
	Orange type- Root length (cm)-HCO-4 (19.5), HCO-183 (19.1) Root weight (g)-HCO-4-2(107.0), HCO-4 (104.30)
Carrot (Temperate)	
SKUAS&T (Srinagar)	Root length (cm)-SH-C-144 (15.93), SH-C-139, SH-C-142 and SH-C-143 (15.80) Root yield (q/ha)-SH-C-144 (244.34), SH-C-143 (238.12)
Cauliflower (Early)	
IIVR	Kunwari: Curd Length (cm)-Kunwari-4 (13.0), Early Kunwari-23-63 (12.8 (15.80), Early KunwariChandra Deo (12.5)
	Kataki: Curd Length (cm)-atki Ramsagar Seed (15.2), Katki JBT-23/55 (15.0) Curd weight (g)- Vijay Kataki (524.0), Katki JBT-23/55 (500.0)
Sabour	Curd Size (cm)-93-2 (16.15), 2006-2 (15.25) Curd weight (g)-2002-1 (450.0), 2006-2 (420.0)
Cauliflower (Mid)	
IIVR	Curd Length (cm)-Pusi Hazipur (18.5), Aghani Hazipur Sel. and Aghani A. S. (18.4) Curd weight (g)- Pusi Hazipur (1026), Cauliflower No.309 (760)
Sabour	Curd Size (cm)- 96-5 M (21.58), 94-2 M (21.05) Curd weight (g)- 96-5 M (585.0), 2007-5M (565.0) Curd Colour- White to Creamy white
Cowpea	
IIHR	Pod yield/plant (t/ha)-IC471933 (27.0), IIHR-247 (22.6) Pod Length (Cm)-IIHR-133 (57.0), IIHR-85and IIHR-254 (54.0)

Table: List of promising germplasm available with different centres (2008-09)

Crops/Source	Notable/ Promising germplasm
Amaranths	
HARP	Yield/plot- 0.9m2 (kg)- HAAMTH-48-Red (3.15) HAAMTH-13-Green (2.65)
Jorhat	Green Leaf & Red Vein- AAU-2 (Pl.wt.61.8 g and leaf wt.34.0g) Leaf & Vein both Red- AAU-1 (Pl.wt.53.1g and leaf wt.23.6g)
Coimbatore	Yield (g)-CO-1 (110.3), A-77 (107.28) Pl. height (cm)- A-77 (207.3), A-99 (201.3
IIHR	Total plant weight (g)-IIHR-258 (240.0), IIHR-255 (156.0) Plant Height (cm)- IIHR-258 (47.0), A. Arunima (45.5)

Crops/Source	Notable/ Promising germplasms
Bottle gourd	
Rahuri	Yield/plant (kg)-RhRBG-18 (9.920), RHRBG-33 (9.600) Earliness (days)-RHRBG-23 (56), RHRBG-17, 10 and 3 (59)
Cucumber	
Solan	Yield/plot-5.4m2 (kg)- LC-10 (28.42), LC-4 (23.51) Fruits/plant -LC-10 (5.16), LC-6 (4.98) Fruit length (cm)-LC-10 (24.36), LC-6 (21.06)
Momordica dioica* and *M. cochinchinensis	
Bhubaneshwar	Fruit yield/plant (kg)-BSG-3 (0.912), BSG-1 (0.645) Edible Maturity (Days)-BSG-4 (69) and BSG-3 (70) Days to first female flowering- BSG-4 (52), BSG-1 (54)
Tomato	
Solan	Yield (q/ha)-LO-1003 (357.0), Lo-2410 (340.0)
Coimbatore	Yield/plant (g)-LE-231 (2867.2), LE-1150 (2484.9) Earliness (Days to 50% flowering)-LE-18 and LE-477 (54.2)
Chillies	
Coimbatore	Yield RED Ripe fruit (g)- ALS- 98-8 (294.49) CA-48 (286.18) Fruits/plant- ALS- 98-8 (132), CA-77 (88.30)
SKUAS&T (S)	Yield RED Ripe fruit (g/plant)-SH-KC-62 (800), SH-KC-64 (656) Fruits/plant- SH-KC-62 (120), SH-KC-64 (102)
IIHR	Yield plant Fresh (g)-Korean collection-3 (210.3), Korean collection-1 (200.0) Dry fruit yield/plant (g)- Korean collection-1 (65.0), Sel.-16 (22.1) Reaction to Diseases (Field Tolerant) *Alternaria* spp.-NE Coll.-1, BCTKVK, Korean coll.-4, Sel.-16 *Cercospora* spp- NE Coll.1, Sikkim Local-1, 2, Korean Coll. 2 and Coll. 4 *Collettrichum* spp.- NE Coll.1, BCTKVK, Sikkim Local-1, *Leveillula* spp.-Sringeri Local-3 and Sringeri Local-4 Mite- Sikkim Local- 2, Korean coll.-3
Capsicum	
Srinagar	Yield/plant (g)-SH-SP-39 (800) SH-SP-38 (770) Fruits/plant- SH-SP-39 (16) SH-SP-41 (14.25) Plant height (cm)- SH-SP-41 (52.1), SH-SP-39 (50.50)
Solan	Yield (q/ha)- Tri Selection (230.0), Gajio Sel. (211) Fruits/plant- Dilman Sel. (12.33) and Tri Selection (10.24)
Katrain	Yield/plant (g)- Bangalore-30 (1250.0), Superset (1100.0) Fruits/plant- Bangalore-30 (30), Superset (25)
IIHR	Yield/plant (g)-ISPN-6-2 (800) Mites (Field Tolerant)-ISPN-6-3, ISPN-6-4
Paprika	
Srinagar	Red Ripe Fruit Wt./plant (g)- SH-P-43 (430) and SH-P-38 (420) Fruits/plant-SH-P-39 (31) and SH-P-40 (28.6)
Katrain	Fruit weight/plant (g)-Indu (800.0), RCH-1 (715.0) Fruits/plant- Indu (123) & Nagajhlokia (74)
IIHR	Fresh Yield/plant (g)- 9852228 (110), 9852136 (100) Dry fruit yield/plant (g)-PBC-535 (25.0), 9852179 (24.0) *Alternaria* + *Cercospora* + *Virus*- (Field Tolerant)-9852136
French bean	
Rahuri	Pod Length (cm)- RHRFB-14 (18.30) and RHRFB-26 (14) Earliness (50% flowering)- RHRFB-5 (38), RHRFB-6(40) and RHRFB-2 (42)

Crops/Source	Notable/ Promising germplasms
Okra	
IIVR	YVMV Free (field Condition)- EC329357, EC329407, and IC45802 More number of fruits/plant- SKY/DR/RS-118 SKY/DR/RS-107, IC282272, IC218444 and EC 169378
Bhubaneshwar	Earliness (50% flowering)-BSBR-24, BSBR-56 and Bo-2 (42 days) Average fruit weight (g)- BBSR-7 (17.1) BBSR-49 (16.8)
NBPGR	Fruits/plant: IC43748 Fruit diameter (cm): IC3345, IC185378
Carrot (Temperate)	
Katrain	Yield/plot kg (2.70M2)-Acc.339(7.00), Acc.342-9(6.750) Root Length (cm)-Acc.-343 (19.0), Acc-341 (18.0)
Cauliflower (Late)	
Katrain	Yield (t/ha.)- Hermia (26.4), Alpha and Composite (23.32) 1-Res. To Downy Mildew- RSK-1301 2-Mod. Res. To Black Rot + Downy mildew- SR-05 Days to 50% Curd Maturity- Agrotech-21 (81days), Alpha (128 days)
Cabbage	
Katrain	Plant Spread (cm)-AC-236 (Max. 49.0), EC490165 (Mini. 22.0) Net Head Weight (kg)-KK-3 (0.933), Sel.-6 (0.900)
Cowpea	
IIVR	Earliness (Days to 50% flowering)- ET-116914, EC528412, EC472283, EC472250 (47.7) Green pod/plant (g) -V-240 (228.41), EC458455 (176.09)
Raipur	Pod Length (cm)-ICP-38 (31.80) Ind. Green pod weight (g)-ICP-10 (13.50), ICP-4 (11.40) GoldenVirus- ICP-1, ICP-24, ICP-38 and ICP-3 ICP-38 Aphid- ICP-3, ICP-24, ICP-38

Vegetable Production

Use of Biofertilizers

Tomato

- At Dharwad, the maximum mean yield of tomato (298.70 q/ha) along with higher C:B ratio (1:2.86) was obtained with the application of VAM @ 15 kg/ha + 75% P (50 kg/ha), 100% N and K (60 and 30 kg/ha, respectively). This may be recommended for tomato production under Dharwad conditions of Karnataka.

Integrated Nutrient Management

Tomato

- At Dharwad, application of FYM @ 20 t/ha + NPK (115:100:60 kg/ha) gave the maximum yield (304.9 q/ha) along with highest C:B ratio (1:2.93). Hence, it is recommended for Dharwad conditions of Karnataka.

Cucumber

- The maximum yield of cucumber (141.7 q/ha) along with highest C:B ratio (1:2.85) was obtained at Dharwad with the application of ½ NPK recommended + vermicompost @ 2 t/ha + *Azospirillum*. Hence, it is recommended for Dharwad conditions of Karnataka.

Carrot

- At Dharwad, application of ½ dose of NPK recommended + Green leaf manure @ 2.5 t/ha + *Azospirillum* @ 5 kg/ha expressed the maximum yield (176.3 q/ha) along with highest C:B ratio (1:2.05) of carrot var. Nantes. Hence, it is recommended for Dharwad conditions of Karnataka.

Bottle gourd

- At IIVR, Varanasi, application of vermicompost @ 2.5 t/ha + 1/2 recommended NPK (N_{60}, P_{30}, K_{30} kg/ha) in bottle gourd cv. Kashi Ganga gave maximum yield (362.58 q/ha) along with highest C:B ratio (1:2.53). Hence, it is recommended for Varanasi conditions of Uttar Pradesh.

Bottle gourd at bower system

Bottle gourd at bower system

- At Faizabad, the maximum yield (462.01 q/ha) of Narendra Sankar Lauki-4 along with higher C:B ratio (1:4.37) was recorded with the application of Neem cake @ 2.5 q/ha + ½ NPK (75:30:30 kg/ha). Hence, it is recommended for Faizabad conditions of Uttar Pradesh.
- At HARP, Ranchi, the maximum yield (353.22 q/ha) along with higher C:B ratio (1:4.86) was obtained with the application of poultry manure @ 2.5 t/ha + half recommended NPK (N_{30}, P_{20}, K_{20} kg/ha). Hence, it is recommended for Ranchi conditions of Jharkhand.
- At Hyderabad, application of poultry manure @ 2.5 t/ha + half recommended NPK (N_{30}, P_{20}, K_{20} kg/ha) gave higher yield (164.0 q/ha) and C:B ratio (1:1.56). Hence, it is recommended for Hyderabad conditions of Andhra Pradesh.

Ranchi- Farmer's Now grow vegetable instead of paddy

Broccoli

- At Faizabad, application of FYM @ 10 t/ha + ½ NPK (recommended for the region) gave the higher yield (147.33 q/ha) and C:B ratio (1:4.60). Hence, it is recommended for Faizabad conditions of Uttar Pradesh.
- At Durgapura, the highest yield (144.56 q/ha) and C:B ratio (1:1.88) of broccoli was obtained by the application of poultry manure @ 2.5 t/ha + ½ recommended NPK. Hence, it is recommended for Durgapura conditions of Rajasthan.
- At Jorhat, application of FYM @ 20 t/ha gave the higher yield (121.0 q/ha) and C:B ratio (1:3.45) of broccoli. Hence, it is recommended for Jorhat conditions of Assam.

Cowpea

- At Bhubaneshwar, cowpea var. Utkal Manik gave the higher yield (67.58 q/ha) and maximum C:B ratio (1:2.36) with the application of Neem cake @ 2.5 q/ha + ½ recommended NPK. Hence, it is recommended for Bhubaneshwar conditions of Orissa.

Garden Pea

- At Jorhat, application of FYM @ 10 t/ha + ½ NPK (recommended for the region) gave the highest yield (88.5 q/ha) and C:B ratio (1:2.90) of garden pea cv. Azad Pea. 3. Hence, it is recommended for Jorhat conditions of Assam.

Studies on micronutrient

Cauliflower

- At IIVR, Varanasi, the maximum yield (390.47 q/ha) along with highest C:B ratio (1:2.50) in cauliflower var. Pusa Snow Ball K-1 was recorded by the application of Borax @ 10 kg/ha + Ammonium molybdate @ 2 kg/ha over and above the recommended dose of NPK (120:60:60 kg/ha). Hence, it is recommended for Varanasi conditions of U.P.
- At Srinagar, application of Borax @ 10 kg/ha along with recommended fertilizer dose gave the maximum curd yield (241.22 q/ha) and higher C:B ratio (1:2.40) in cauliflower. Hence, recommended for Kashmir Valley conditions of J&K.

Micronutrient application in cauliflower

Tomato

- At Bhubaneshwar, the maximum yield (347.34 q/ha) along with highest C:B ratio (1:4.82) was obtained with three foliar sprays of 100 ppm of Manganese (as manganese sulphate) at interval of 10 days, starting 30 DAT, over and above the recommended dose of NPK. Hence, recommended for Bhubaneshwar conditions of Orissa.
- At Jabalpur, the maximum yield of tomato (304.10 q/ha) along with higher C:B ratio (1:2.29) was obtained in tomato var. JT-99 by three foliar sprays of 100 ppm of Manganese (as manganese sulphate) in addition to recommended dose of NPK at 30 DAT on 10 days interval. Hence, recommended for Jabalpur conditions of M.P.

Bitter gourd

- The maximum yield of bitter gourd var. Pusa Do Mausami (165.51 q/ha) was obtained with three foliar sprays of a commercial formulation of multiplex (0.5%) in addition of recommended dose of NPK at 10 days interval from 30 days after seed sowing. Hence, it is recommended for Durgapura conditions of Rajasthan.

Cropping System

- Brinjal – Spinach – okra cropping sequence was found to be the most remunerative at Hyderabad and it expressed the higher C:B ratio i.e. 1:2.26. Hence, this cropping sequence may be advocated to be followed by the growers of Hyderabad.

Protected Conditions

Cucumber

- At IIHR, Bangalore under naturally ventilated polyhouse conditions, cucumber hybrid Malini gave the maximum yield (1174.0 q/ha). Hence, this hybrid is recommended for protected cultivation in Bengaluru areas.

Varietal Trials

Yield data for the year 2005-06, 2006-07, 2007-08 and 2008-09 was thoroughly scrutinized by the committee and the following 11 entries of 8 crops were identified for release and notification.

Table 2: List of vegetable varieties identified

Crops	Entries	Source	Recommended Zones
Brinjal Long	PB-67	GBPUA&T, Pantnagar	IV
Chilli	PC-7	GBPUA&T, Pantnagar	V
	HS-HP-154	SKUA&T, Srinagar	VIII
Paprika Chilli	IVPBC-535	IIVR, Varanasi	VIII
French bean (bush type)	Arka Anup	IIHR, Bangalore	I, V & VIII
	HAFB-3	HARP, Ranchi	VI
French bean (pole type)	HAPB-4	HARP, Ranchi	VIII
Bottle gourd	NDBG-619	NDUA&T, Faizabad	VII
Ash gourd	IVAG-3	IIVR, Varanasi	IV
Pumpkin	HAPK-10	HARP, Ranchi	I
Dolichos bean (pole type)	HADB-3	HARP, Ranchi	V

Brinjal Var.- PB-67

Chilli Pant C-7

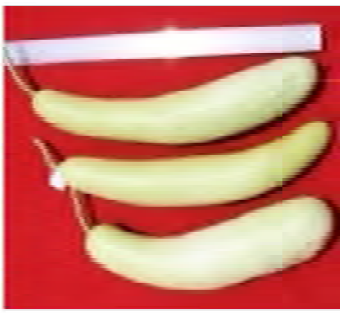
HS-HP-154

IVPBC-535 (Kashi Sinduri)

French bean Arka Anoop

HAFB-3

HAFB-4



NDBG-619

IVAG-3 (Kashi Surbhi)

HAPK-10 (Swarna Amrit)

HADB-3

Physiology, Biochemistry and Processing

- At IIVR Varanasi, 25 promising genotypes of tomato including OP and hybrids, 11 genotypes of bitter gourd and 10 genotypes of pumpkin were analyzed for quality attributes. Amongst the 25 tomato genotypes, the pH ranged from 3.85 (SHT-H-3) -4.70% (ATL-02-39), acidity from 0.305 (ARTH-1023) to 0.510 (ATL-02-39) and TSS from 3.5 (HTH-2-2) to 5.1 (BSS-575). Large variability was recorded for ascorbic acid content, which varied from 19.25 (KS-227) to 25.29mg/100g (Rathee). The total carotenoid content ranged from 4.23 (Rathee) to 6.82 mg/100g (HTH-2-1), whereas, lycopene content ranged from 3.32 (PAU-2371) to 5.02 mg/100g (BCTH-62).
- Amongst the 11 bitter gourd genotypes tested for quality attributes, the vitamin C content ranged from 62.65 (DVBTG-5) to 120.32 mg/100g (VRBT-100) and the carotenoid content ranged from 1.24 (VRBT-41) to 4.05 mg/100g (DVBTG-5).
- In the pumpkin, genotype the vitamin C content ranged from 2.95 to 5.12 mg/100g whereas, the carotenoid content ranged from 0.89 to 2.73 mg/100 g.
- At PAU, Ludhiana, 45 tomato genotypes were analyzed. The maximum vitamin C (45.0 mg/100ml juice) was recorded in genotypes TH-670 and Rathee, but it was not significant. The lycopene content (3.81 mg/100g) was the maximum in ARTH-1023 and carotenoid content was the maximum in DVRT-2 (8.70 mg/100g, respectively).
- At IIVR, Varanasi, amongst the 13 genotypes of chilli, the capsaicin content ranged from 0.29-1.23% and the maximum capsaicin was recorded in genotype Arka Abhir, and minimum in Byadagi Dabbi, whereas, the oleoresin content ranged from 13.23-19.92 % and maximum oleoresin content was recorded in LCA-436.

Insect Pest Management

- The IPM module for the management of shoot and fruit borer in brinjal, involving installation of 100 plastic funnel traps per hectare at a distance of 10 m between the traps, baited with sex pheromone lure, clipping of infested shoots and fruits and their destruction at weekly intervals and spraying of 4% NSKE four times at an interval of 15 days from flowering proved highly effective and recommended under Rahuri and Katrain conditions.
- Seed treatment of chilli with thiamethoxam 75 SP @ 5 g./kg seed followed by four alternate sprays of NSKE 4% with fipronil @1.5 ml/l and avermectin @ 0.5 ml./l. at an interval of 15 days proved effective for the management of thrips and mites, respectively and recommended under Rahuri conditions.
- In Solan, soil application of carbofuran @ 500 g a i. /ha at the time of sowing was found effective against red pumpkin beetles and serpentine leaf miner in cucumber, with higher yield and cost benefit ratio.

In Ludihana, two sprays of imidacloprid 200 SL @ 0.3 ml/l first coinciding with pest appearance followed by second spray after 25 days for aphid management and four sprays of spinosad 45SC @ 0.5ml/l at 15 days interval from flowering for the control of fruit borer in tomato was found to be effective with maximum cost benefit ratio.

Red Pumpkin Beetle

Seed Production

- Based on three years trials, three sprays of 100 ppm boron at 10 days interval after 40 days of transplanting in tomato under Jorhat conditions and commercial formulation Multiplex for okra under Raipur conditions are recommended for higher yield of good quality seed.
- A minimum isolation distance of 800 m is recommended for genetically pure and quality seed production of Bitter gourd under Jharkhand conditions based on trials conducted for three years at HARP, Ranchi.
- Priming brinjal seeds with 150 ppm KNO_3 is recommended for maximum seed germination and vigour based on trials at Coimbatore.
- Retention of first 10-12 fruits per plant in okra produced higher yield of good quality seeds under Vellanikkara conditions.
- 27-days old seedlings of tomato and 30-days old seedlings of capsicum were found ideal for higher quality seed yield under mid-hill conditions of Himachal Pradesh, based on the trials conducted at Solan.
- Spray of 100 ppm GA or 100 ppm NAA at 30 and 50 DAS is recommended for higher seed yield, germination percentage and seed vigour of okra based on three years trials at Jabalpur.

Hybrid Trials

The yield data for the years 2005-06, 2006-07 and 2007-08 was thoroughly scrutinized by the committee and the following eleven entries of different vegetable crops were identified for recommendation and release.

Table 3: List of vegetable hybrids identified

Crops	F_1 hybrid	Source	Recommended Zones
Bottle gourd	Santosh-20	Krishidhan Seeds	IV
Tomato (indet.)	BSS-488	Bejo Sheetal Seeds	VI
	Himsohna	Syngenta Seeds	II
Tomato (det.)	Tai-01458	Syngenta Seeds	IV
Ridge gourd	Pallavi	Sungro Seeds	V
	HYRGH-5HB	APHU, Hyderabad	VII
Chilli	BSS-453	Bejo Sheetal Seeds	II
Brinjal (long)	Rasika	Bejo Sheetal Seeds	IV
	Shamli	Seminis	IV
Brinjal (small round)	VNR-51C	VNR Seeds	IV
Brinjal (round)	HABH-8	HARP, Ranchi	VIII

Santosh-20 BSS-488 Himsohna Tai-01458/ TO-01458

Pallavi HYRGH-5HB (Haritham) BSS-453 Rasika

Shamli VNR-51C HABH-8 (Swarn Mohit)

Disease Management

Recommendations

1. Ludhiana has reported that tomato big bud disease (Phytoplasma) and nematode diseases in vegetable were increasing severely in Punjab. Hessaraghata reported that tomato leaf curl was found very high (67.5%) in summer seasons and the incidence of spotted wilt disease caused by Groundnut bud necrosis virus was found more in kharif season in tomato. Kalyani has concluded the trial Veg. 8.1 with recommendations that *Sclerotinia sclerotiorum* in French bean, stem bleeding of bottle gourd and *Choanephora* twig blight of chilli have become problematic in some parts and TLCV in tomato and YVMV in okra appeared in severe form in different parts of West Bengal. Hyderabad concluded the experiment by reporting TLCV, Mosaic, leaf blight, Fusarium wilt and spotted wilt as major diseases of tomato. Sabour has also concluded the trial with the recommendation that damping off, early blight, late blight, mosaic and leaf curl in tomato and damping off, black rot, and leaf spots in cabbage/cauliflower appeared as major diseases in Bihar.
2. Kalyani and Sabour have concluded the experiment Veg. 8.2 with the recommendation that soil application of green manuring + neem cake @ 10q/ha, and seed and soil treatment with bioagents (*Trichoderma viride*@2.5 kg/ha) for the management of root and collar rot of okra and brinjal crops, respectively.

3. Kalyani concluded the experiment Veg. 8.3 with the recommendation that the min. RH and min. temperature contributed significantly for variation in the development of downy mildew of cucumber; whereas Hyderabad concluded the experiment Veg. 8.3 with the recommendation that the independent variable (rainfall) contributed significantly for variation in the development of powdery mildew of okra. Sabour has also concluded the trial with the recommendation that early blight epidemic in tomato negatively correlated between disease progress and temperature, relative humidity, rainfall and number of rainy days in Bihar.

4. The experiment Veg. 8.4 was concluded by Kalyani and Hyderabad with recommendation that T6 (*Trichoderma viride* @ 5g/kg seed) recorded best; In Solan T4 (Carbendazim @ 1 g / Kg seed + Thiram @ 2 g/Kg seed) was recorded the best giving 86.58% seed germination. In Sabour and Lam T5 (Carbendazim @ 1 g / Kg seed + Captan @ 2 g/Kg seed) appeared the best with 91% seed germination and Vellanikkara T9 (Seed treatment with *T. viride* @ 6 g/kg seed + captan @ 1g/kg seed) performed well in tomato and the trial was deleted from this year as all the centres concluded.

5. Vellanikkara concluded the experiment Veg. 8.5 with recommendation that T9 (i.e. FYM @ 25 t/ha, green manuring, application of talcum formulation of PGPR @ 5 kg/ha, seedling root dip of PGPR, PGPR soil drenching @ 1%, maintaining planting distance, drainage management by making gradual slope and liming in acid soil) recorded the least disease incidence and highest yield in brinjal.

6. Vellanikkara concluded the experiment Veg. 8.6 with recommendation T5 (Seed treatment with Ridomil @ 0.25% +Three times removal of infected leaves and Mancozeb spray) was the best for management of downy mildew of bitter gourd in Kerala.

Resistant Varietal Trials

The committee reviewed the data of 2004-05, 2005-06, 2006-07, 2007-08 trials and following varieties have been recommended

Table 4: List of the resistant varieties identified

Crop	Entries	Source	Recommended Zones
Pea (mid season) Powdery mildew resistant	VRPMR-11	IIVR, Varanasi	IV
	VP-233	VPKAS, Almora	I

VRPMR-11(Kashi Samridhi) VP-233

Breeders Seed Production and Price Review

After thorough discussion in the house, the breeder seed price of following six vegetables as listed below were revised:

Table 5: Rate of breeder seeds

S. No.	Vegetables	Existing Rates (Rs./kg)	Revised Rates (Rs./kg)
1.	Tomato	1000.00	1400.00
2.	Cowpea	100.00	140.00
3.	Dolichos bean	125.00	150.00
4.	Garden Pea	90.00	100.00
5.	Musk melon	450.00	500.00
6.	Long melon	Not available so far	400.00

The breeder seed price of all other crops were approved for current year by the house as fixed during last year. Incorporating the suggestions of the house, the revised breeder seeds prices were finalized as given below:

Table 6: Rate of breeder seeds

S.No.	Name of vegetables	Rate (Rs./kg)	S.No.	Name of vegetables	Rate (Rs./kg)
1.	Palak	90	17.	Radish	300
2.	Methi	100	18.	Carrot	400
3.	Okra	200	19.	Turnip	250
4.	Tomato	1400	20.	Onion	600
5.	Brinjal	650	21.	Bottle gourd	350
6.	Chilli	700	22.	Bitter gourd	450
7.	Capsicum/Paprika	2000	23.	Sponge gourd	350
8.	Cowpea	140	24.	Ridge gourd	350
9.	Cluster bean	100	25.	Cucumber	800
10.	French bean	150	26.	Tinda (Round melon)	200
11.	Dolichos bean	150	27.	Pumpkin	450
12.	Garden pea	100	28.	Muskmelon	500
13.	Early/Mid-early/Mid Cauliflower	1000	29.	Water melon	550
14.	Late Cauliflower	2500	30.	Coriander	100
15.	Cabbage	650	31.	Amaranthus	200
16.	Knol Kohl	400	32.	Long melon	400

The revised prices after approval of the Council will be circulated by Director, IIVR, Varanasi to all the centres who are producing breeder seeds under the national seed chain. At the end of the session, the Chairman made following observations:

- Monitoring of conversion of breeder seed to foundation and certified level to be taken up with DAC.
- The region wise list of new varieties to be circulated to all State departments Director Horticulture/ Director Agriculture/Private Companies.
- The seeds of any released variety/parental line can be arranged from NBPGR to revive by further multiplication.
- At the time of sowing, some seeds should always be retained for use in case the crop is damaged due to natural calamities.

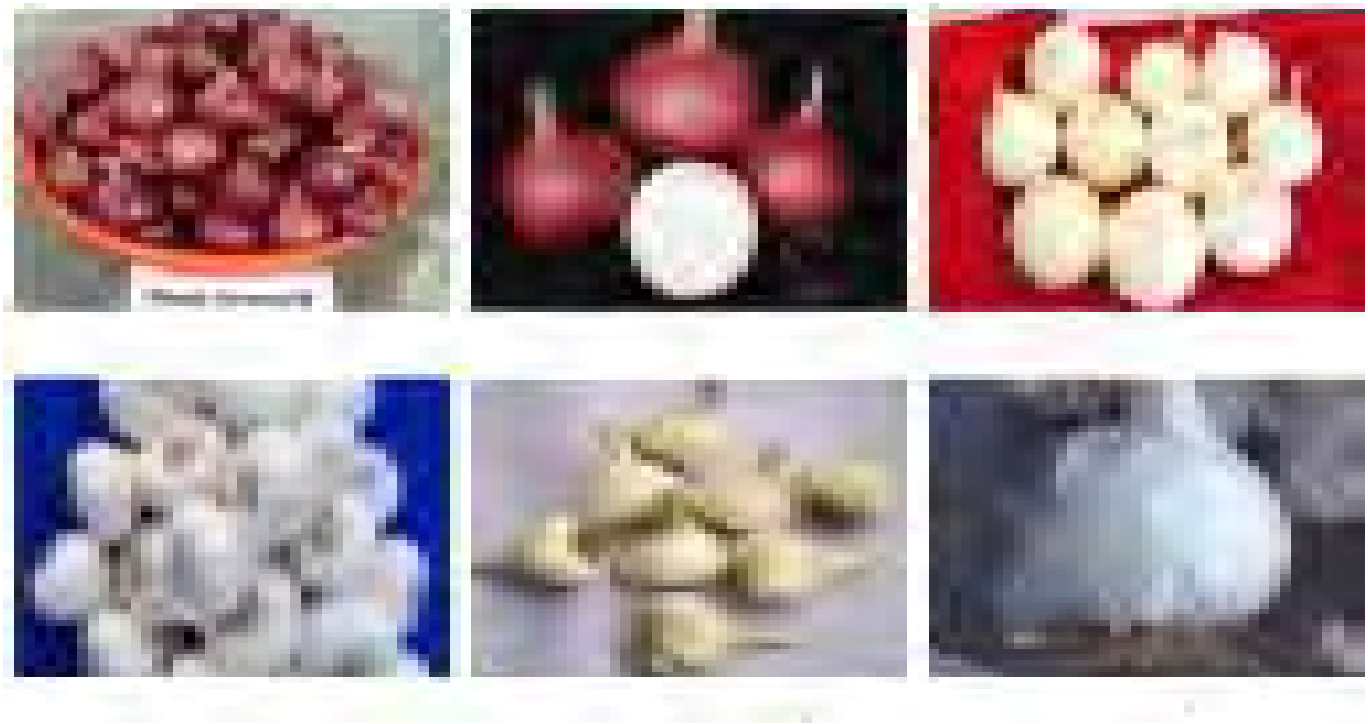
Onion and Garlic

Varietal Trial:

The committee examined the performance of the entries for four consecutive years and recommended the following varieties for identification and release:

Table 7: List of varieties identified

Crops	Entries	Source centre	Recommended Zones
Onion	RHRO-S1	MPAU, Rahuri	VIII, VI
	B-780-5-3-1	NRCOG, Rajgurunagar	VII
	PKV White	PDKV, Akola	VI
Garlic	JNDG-213	JAU, Junagarh	IV
	AC-200	NRCOG, Rajgurunagar	VI
	RAUG-5	Sabour	VII



Germplasm collection & Evaluation:

Out of 26 white onion germplasm lines evaluated, 4 germplasm viz. W- 429, W-224, W-201 & W-127 gave high MY (29.3 – 33.3 t/ha) against check PWR (22.78 t/ha) at NRCOG, Rajgurunagar. Thirty five germplasm lines were evaluated at Nashik and No. 760, 740, 357 & ALR were found tolerant against Stemphyllium blight disease & 752, 566, & 325 against thrips. At Junagarh, out of 19 red onion germplasm lines JRO-0717(321.2 q/ha) & JRO-0714 (301.6 q/ha) performed better for bulb yield than the check Talaja Red (271 q/ha) during rabi season.

Out of 30 collections of garlic, Coll. No. 378, 282, 131 and 384 performed well for high TSS and dry matter content at RRS, Karnal. Among 16 germplasm lines evaluated at Junagarh, JG-0713 (102.22 q/ha); JG-0707 (94.44 q/ha) and JG-0708 (91.85 q/ha) gave higher bulb yield.

Agronomy trials

1. The trial was conducted for three years on "Effect of planting and fertilizers application methods on yield and quality of onion seed" and concluded at Junagarh Agricultural University, Junagarh –

Growing on ridges with normal spacing (30 x 30 cm) produced highest significant onion seed yield of 817.10 kg/ hectare with maximum net return of Rs 79,915.00 per hectare and CB ratio of 1:1.87.

2. The trial on "Influence of pelleting and planting methods in onion", conducted and concluded at Rahuri. Among the various pelleting materials tried, the highest bulb yield was recorded in onion seeds pelleted with Karanj leaf powder (500 g per kg of seed) in flat bed system during *Kharif* season and in *Rabi* season higher bulb yield was recorded in flat bed system of planting with Bavistin (3g/ kg of seed).

Public Private Interface

The Chairman, Dr. S.L. Mehta, Former Vice-Chancellor, MPUA & T, Udaipur. emphasized that the partnership between public and private must be co-operative, completely transparent and honest, at the same time the breeding lines and varieties developed out of the partnership must be of good quality and cost should be affordable by the farmers.

Dr. P. Subbiyan, Director of Agricultural Business, TNAU, Coimbatore briefed about TNAU-Private Seed Sector Research and Technology Consortium that was initiated in 2007. He informed that this consortium was developed mainly to co-ordinate Agribusiness and started with the venture capital Rs 6.0 crores and primarily focusses on rice, millets, oil seeds and horticultural crops. He also informed that TNAU has developed a clear cut guideline, which contains the information about the membership fee, royalty, MOU, quality maintenance, brand name and testing fees, etc.

Dr. S.U. Baig, Nath Biogene, emphasized the role of private sector in seed production and desired that there should be no differentiation between public and private sector with regard to the sharing of germplasm lines.

Dr. D.S. Cheema, Head, Department of Vegetable Crops, PAU, Ludhiana stressed that there should be complete transparency in any agreement and research benefit should be shared on MoU basis. The materials should be shared by both parties.

Dr. Mathura Rai, Director, IIVR, Varanasi, emphasized that private sector should continue with vision and mission so that seed should reach to the farmers through private sectors. He suggested that i) system of working together should be developed, ii) private sector must consider the cost of seed material and it must be amicable to farmers to buy, iii) system of profit sharing adopted by IARI or ICRISAT or AVRDC, and iv) on MoU basis both systems should work synergistically.

XXVIII-Workshop

Venue : I.I.H.R., Bangalore

Date : 16th – 19th January, 2010

Collection, Evaluation and Conservation of germplasm

Table 1: List of promising germplasm available with different centres (2008-09)

Crops/Source	Notable/ Promising germplasm
Amaranths	
HARP, Ranchi	**Yield/plot**- 0.9m2 (kg)- HAAMTH-48-Red (3.15) HAAMTH-13-Green (2.65)
Jorhat	**Green Leaf & Red Vein**- AAU-2 (Pl.wt.61.8 g and leaf wt.34.0g) **Leaf & Vein both Red**- AAU-1 (Pl.wt.53.1g and leaf wt.23.6g)
Coimbatore	**Yield (g)**-CO-1 (110.3), A-77 (107.28) **Pl. height (cm)-** A-77 (207.3), A-99 (201.3
IIHR	**Total plant weight (g)-**IIHR-258 (240.0), IIHR-255 (156.0) **Plant Height (cm)-** IIHR-258 (47.0), A. Arunima (45.5)