

## PARTICIPATORY VARIETAL SELECTION ON CAULIFLOWER, CABBAGE AND TOMATO UNDER ON FARM CONDITION OF JUMLA

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### ABSTRACT

*On farm experiments were carried out during the rainy season of 2008 and 2009 in order to identify suitable cauliflower, cabbage and tomato varieties under on farm conditions. A total of three genotypes of cauliflower, six genotypes of cabbage and four genotypes of tomato were tested in RCBD. The results revealed that Snow Crown variety of cauliflower was the highest yielder (22.9 t/ha) followed by Snow Ball 16 (19.5 t/ha) whereas cultivar Katmandu Local was lowest yielder (16.2 t/ha). Farmer's preferred Snow Crown variety of cauliflower because of its earliness, good taste and high yield potential. Likewise, Green Coronet variety of cabbage was the highest yielder (88.89 t/ha) followed by Copenhagen Market (82.72 t/ha) whereas Golden Acre was lowest yielder (33.95 t/ha). Farmer's preferred Green Coronet variety of cabbage because of its good taste, cold tolerance and high yield potential. Likewise, Srijana variety of tomato was the highest yielder (16.6 t/ha) followed by Manisha (14.9 t/ha) whereas cultivar Pusa Ruby was the lowest yielder (11.9 t/ha).*

### INTRODUCTION

Genotypes of cauliflower, cabbage and tomato selected from on station varietal investigation were verified as farmer's field trials at outreach research sites of Jumla. The aim of the experiment was to finetune the varietal section process by getting socio-economic information in addition to biological information.

### MATERIALS AND METHODS

This experiment was conducted at Patmara, Chandannath and Mahat VDCs of Jumla during the rainy seasons of 2008 and 2009. Three different cultivars of cauliflower were evaluated and compared with Katmandu Local. Likewise, six different cultivars of cabbages were evaluated and compared with Copenhagen Market. The genotypes were tested in RCBD with five replications. The plot size assigned was 14.04 m<sup>2</sup> (2.4 m x 5.85 m). The plots were fertilized with 20 t compost/ha. Seed sowing in the nursery bed was done on the 2<sup>nd</sup> week of Baisakh. One month old 40 seedlings of each variety per plot were transplanted with 60 cm x 45 cm spacing. The cauliflower was harvested at full curd mature stage. Similarly, four different cultivars of tomato i. e. Shrijana, Bishes, Manisha and Pusa Ruby were evaluated in RCBD with four replications (one farmer per replication). The plot size assigned was 10.12 m<sup>2</sup> (4.5 m x 2.25 m). The plots were fertilized with 20 t compost/ha. Seeding was done on 2<sup>nd</sup> week of Baisakh. One month old 30 seedlings (3 rows of 10 plants) of each variety were transplanted with 75 cm x 45 cm spacing. Irrigation and other management practices were done as needed. Necessary data were recorded periodically. ANOVA on vegetative and yield parameters was performed by MSTATC version (1986). Data analysis procedures were followed as described by Gomez and Gomez (1984).

### RESULTS AND DISCUSSIONS

Number of leaves, curding DAT, harvesting DAT, biomass, curd diameter and curd yield per plant among the tested cultivars were statistically significant. Highest number of leaves were observed in Snow Ball 16 (19) followed by Katmandu Local (17) whereas lowest in Snow Crown (11). Highest biomass (1.89 kg) was received from the cultivar Snow Crown followed by Katmandu Local (1.57 kg) whereas lowest in cultivar Snow Ball 16 (1.53 kg) (Table 3). With regard to maturity, curd initiation was earlier in Snow Crown (46 DAT) followed by Snow Ball 16 (51 DAT) whereas Katmandu Local was found late (57 DAT). With respect to yield and its attributes, highest curd diameter was observed in cultivar Snow Crown (24 cm) followed by Snow Ball 16 (18 cm) whereas lowest in Katmandu Local (17 cm). Highest yield plant (0.57 kg) was obtained in Snow Crown followed by Snow Ball 16 (0.48 kg) whereas lowest in Katmandu Local (0.4

kg). Likewise, cultivar Snow Crown was the highest yielder (22.9 t/ha) followed by Snow ball 16 (19.5 t/ha) whereas cultivar Katmandu Local was lowest yielder (16.2 t/ha) under on farm conditions of Jumla. Farmer's preferred Snow Crown cultivar of cauliflower because of its earliness, good taste and high yield potential.

**Table 1:** Characteristics of cauliflower cultivars tested at Jumla condition during the rainy season production during 2007/2008

Varieties	Curding (DAT)	Harvesting (DAT)	Biomass (Kg)	Curd Dia.(Cm)	Yield (Kg/Plant)	Yield (t/ha)	Farmer's preference
Katmandu local	56	67	1.64	16	0.41	16.21	F
Snow ball 16	51	62	1.60	17	0.48	19.15	F
Snow Crown	46	56	1.92	23	0.56	22.46	VG
P	**	**	*	**	**	**	
LSD(0.05)	0.38	0.88	0.19	1.5	0.04	2.13	
CV (%)	0.5	0.9	7.6	5.4	5.7	6.95	

**Table 2:** Vegetative and yield characteristics of cauliflower cultivars tested at farmer's field condition of Jumla, during the rainy season of 2008/2009,

Varieties	Curding (DAT)	Harvesting (DAT)	Biomass (Kg)	Curd Dia.(Cm)	Yield (Kg/Plant)	Yield (t/ha)	Farmer's preference
Katmandu local	57	67	1.50	17	0.40	16.19	F
Snow ball 16	51	63	1.46	18	0.49	19.87	F
Snow Crown	45	56	1.86	24	0.58	23.40	VG
P	**	**	*	**	**	**	
LSD (0.05)	1.23	1.3	1.3	1.78	0.05	1.65	
CV (%)	1.7	1.4	8.7	6.3	5.3	5.7	

**Table 3:** Combined of cauliflower cultivars tested at farmer's field condition of Jumla during rainy season of 2007/2008- 2008/2009

Varieties	Curding (DAT)	Harvesting (DAT)	Biomass (Kg)	Curd Dia.(Cm)	Yield (Kg/Plant)	Yield (t/ha)
Katmandu local	57	67	1.57	17	0.405	16.20
Snow ball 16	51	63	1.53	18	0.485	19.51
Snow Crown	46	56	1.89	24	0.570	22.93

Number of leaves, heading DAT, harvesting DAT, biomass, head diameter and head yield per plant among the tested cabbage cultivars were statistically significant. Highest number of leaves were observed in Copenhagen Market (14) followed by Green Coronet (11) whereas lowest in Zenith and T 621 (7). Highest biomass (3.55 kg) was received from the cultivar Green Coronet followed by Copenhagen Market (3.12 kg) whereas lowest in Golden Acre (1.38 kg). Head initiation was earlier in Golden Acre (29 DAT) followed by Zenith (32) whereas Green Coronet was found late (39 DAT). With respect to yield and its attributes, highest head diameter was observed in Green Coronet (35 cm) followed by Copenhagen Market (32 cm) whereas lowest in Golden Acre (27 cm). Highest yield plant (2.4 kg) was obtained in Green Coronet followed by Copenhagen Market (2.23 kg) whereas lowest in Golden acre (0.92 kg). Likewise, cultivar Green Coronet was the highest yielder (88.89 t/ha) followed by Copenhagen Market (82.72 t/ha) whereas Golden Acre was lowest yielder (33.95 t/ha). Farmer's preferred Green Coronet cultivar of cabbage because of its good taste and high yield potential.

**Table 4:** Characteristics of cabbage cultivars tested at Farmer' field condition of Jumla during the rainy season of 2008

Varieties	Heading (DAT)	Harvesting (DAT)	Biomass (Kg)	Head Dia. (Cm)	Yield (Kg/Plant)	Yield (t/ha)	Farmer's preference
T 621	36	76	2.70	30	2.00	74.07	VG
Green Coronet	38	82	3.73	36	2.43	90.12	VG
Copenhagen Market	37	57	3.20	32	2.30	85.19	G
Golden Acre	30	50	1.47	27	1.00	37.04	G
Pride of India	33	74	2.27	28	1.23	45.68	F
Zennith	31	77	2.53	29	1.97	72.84	VG
P	*	**	**	**	**	**	
LSD (0.05)	6.03	4.4	0.13	0.87	0.09	3.47	
CV (%)	9.8	3.5	2.8	1.6	2.8	2.8	

**Table 5.** Characteristics of cabbage cultivars tested at Farmer' field condition of Jumla during the rainy season of 2008

Varieties	Heading (DAT)	Harvesting (DAT)	Biomass (Kg)	Head Dia. (Cm)	Yield (Kg/Plant)	Yield (t/ha)	Farmer's preference
T 621	35	70	2.50	29	1.90	70.37	VG
Green Coronet	40	81	3.37	34	2.37	87.65	VG
Copenhagen Market	36	55	3.03	32	2.17	80.25	G
Golden Acre	28	50	1.30	26	0.83	30.86	G
Pride of India	35	72	2.10	28	1.07	39.51	F
Zennith	32	75	2.30	28	1.70	62.96	VG
P	**	**	**	**	**	**	
LSD (0.05)	2.09	3.39	0.17	2.63	0.14	5.17	
CV (%)	3.4	2.5	3.9	4.9	4.6	4.6	

**Table 6.** Combined characteristics of cabbage cultivars tested at Farmer' field condition of Jumla during the rainy season of 2008 and 2009

Varieties	Heading (DAT)	Harvesting (DAT)	Biomass (kg)	Head Dia. (cm)	Yield (kg/plant)	Yield (t/ha)
T 621	36	73	2.60	29	1.95	72.22
Green Coronet	39	82	3.55	35	2.40	88.89
Copenhagen Market	37	56	3.12	32	2.23	82.72
Golden Acre	29	50	1.38	27	0.92	33.95
Pride of India	34	73	2.18	28	1.15	42.59
Zennith	32	76	2.42	29	1.83	67.90

Growth habit among the tested cultivars of tomato was indeterminate type. Regarding the shape of fruits, Shrijana and Manisha were found oval fruit shapes whereas rest were round fruit shape. As far as the flowering days among the tested cultivars is concerned, first flowering was observed in Pusa Ruby (48 DAS) followed by Bishes (53 DAS) whereas Srijana was late in flowering (68 DAS). With regard to maturity, first harvesting in Pusa Ruby was earlier (84 DAS) and followed by Bishes (83 DAS) whereas Shrijana was late (93 DAS). With respect to yield and its attributes, Manisha produced biggest fruit size (45 gm) followed by Shrijana (39 gm) whereas smallest in Pusa Ruby (27 gm). Number of fruits per plot was highest (456) in Pusa Ruby followed by Bishes (451) and lowest (335) in Manisha. Highest yield per plot (17 kg) was recorded in Shrijana followed by Manisha (15 kg) and lowest in Pusa Ruby (12 kg). Likewise, cultivar Srijana was the highest yielder (16.6 t/ha) followed by Manisha (14.9 t/ha) whereas cultivar Pusa Ruby was the lowest yielder (11.9 t/ha). The fruit yield received from the different cultivars was found significant. Fruit firmness of Manisha was hard whereas semi hard firmness in Shrijana and Bishes, soft firmness was observed in Pusa Ruby. Srijana was resistant to blight and fruit borer whereas rest cultivars were susceptible. Pusa Ruby was more acidic in taste whereas manisha was sweet and rest cultivars were medium

acidic in taste. Juice content of Srijana and Pusa Ruby was high whereas rest cultivars were less juice content. The cooking quality of Manisha was inferior whereas rest cultivars were easily cooked. Transportation loss was high in Pusa Ruby (30%) followed by Bishes (15%) whereas less in Shrijana and Manisha (10%). Overall market response of Srijana and Manisha was very good whereas fair in other cultivars.

**Table 7: Yield characteristics of tomato cultivars tested at ORS of HRS, Jumla during 2008**

Varieties	Days to 1 <sup>st</sup> flowering	Days to 1 <sup>st</sup> harvest	No of harvest	Marketable Yield/plot		Unmarketable Yield/plot		Total Yield/plot		Fruit Wt. (gm)	Fruit Yield (t/ha)
				No	Wt.(kg)	No	Wt.(kg)	No	Wt (kg)		
Shriaina	67	94	4	291	12.68	133	3.18	424	15.85	37	15.66
Bishes	54	83	4	248	8.83	198	3.46	446	12.28	28	12.14
Manisha	59	94	4	222	10.09	108	4.44	330	14.53	44	14.36
Pusa Ruby	49	73	4	253	6.78	221	4.55	495	11.33	23	11.19
P	**	**		NS	*	NS	NS	NS	**		**
LSD (0.05)	1.9			100.9			1.15				
CV (%)	2.08	2.2		24.9	1.7	93.7	18.4	171.5	1.18		1.17
		1.6			11.5	35.0		25.0	5.5		5.5

**Table 8: Yield characteristics of tomato cultivars tested at ORS of HRS, Jumla during/2009**

Varieties	Days to 1 <sup>st</sup> flowering	Days to 1 <sup>st</sup> harvest	No of harvest	Marketable Yield/plot		Unmarketable Yield/plot		Total Yield/plot		Fruit Wt. (gm)	Fruit Yield (t/ha)
				No	Wt.(kg)	No	Wt.(kg)	No	Wt (kg)		
Shrijana	68	91	4	305	14.50	129	3.15	429	17.65	41	17.44
Bishes	52	82	4	246	9.70	210	3.85	456	13.55	30	13.39
Manisha	57	90	4	220	11.25	120	4.40	340	15.65	46	15.46
Pusa Ruby	47	74	4	230	7.75	220	5.00	417	12.75	31	12.60
P	**	**		NS	*	*	*	*	**		**
LSD (0.05)							83.9				
CV (%)	2.0	5.5		104.8	2.9	30.0	1.2	153	1.86		1.85
	2.24	4.1		26.2	17.2		18.5	23.3	7.8		7.8

**Table 9. Vegetative characteristics of tomato cultivars tested at ORS of HRS, Jumla during rainy season of 2008 and 2009**

Varieties	Insects & diseases	Plant type	Shape	Firmness	Color	Fruit		Cooking quality	Transportation Loss (%)	Market response
						Taste/TSS	Juice			
Shrijana	None	Indeter	Oval	Semi hard	Red	Medium/ 5.3	Very Juicy	Easy cooked	10	Very good
Bishes	Fruit borer	Indeter	Round	Semi Hard	Red	Medium/ 3	Juicy	Easy cooked	15	Good
Manisha	Fruit borer, Late blight	Indeter	Oval	Hard	Red	Sweet/ 3	Juicy	Not easy cooked	10	Good
Pusa Ruby	Fruit borer, Late blight	Indeter	Round	Soft	Red	Sour/ 4	Very Juicy	Easy cooked	30	Good

**Table 10.** Combined Yield characteristics of tomato cultivars tested at ORS of HRS, Jumla during 2008 and 2009

Varieties	Days to 1 <sup>st</sup> flowering	Days to 1 <sup>st</sup> harvest	No of harvest	Marketable Yield /plot		Unmarketable Yield/plot		Total Yield/plot		Fruit Wt. (gm)	Fruit Yield (t/ha)
				No	Wt.(kg)	No	Wt.(kg)	No	Wt (kg)		
Shrijana	68	93	4	298	14	131	3	427	17	39	16.6
Bishes	53	83	4	247	9	204	4	451	13	29	12.8
Manisha	58	92	4	221	11	114	4	335	15	45	14.9
Pusa Ruby	48	74	4	242	7	221	5	456	12	27	11.9

### CONCLUSIONS AND RECOMMENDATIONS

Farmers preferred Snow Crown variety of cauliflower because of its earliness, good taste and high yield potential. Farmers preferred Green Coronet variety of cabbage because of its good taste, tolerant to frost injury and high yield potential. Likewise, Srijana variety of tomato was found significantly superior ones among the tested cultivars for rainy season cultivation under open field condition of Jumla.

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