

Table 2: Effect of pre-planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on plant growth characters during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008					2008/2009				
Treatments											
cultivars	Micronutrients (ppm)	Plant height (cm)	Number of leaves/ plant	Neck diameter (cm)	Bulb diameter (cm)	Bulbing ratio	Plant height (cm)	Number of leaves/ plant	Neck Diameter (cm)	Bulb diameter (cm)	Bulbing ratio
Balady	(control)	78.83	8.80	1.20	4.23	0.283	74.20	7.76	1.17	3.90	0.300
	500 Zn	82.06	8.76	1.40	4.66	0.300	78.83	8.05	1.40	4.33	0.323
	400 Cu	85.70	10.0	1.56	5.06	0.308	82.43	8.26	1.63	4.50	0.362
	1000Mn	84.0	9.48	1.51	4.93	0.306	79.56	8.16	1.55	4.45	0.348
	1000Mn+500Zn	85.20	9.66	1.72	5.35	0.321	84.23	8.43	1.71	4.63	0.369
	500Zn+400Cu	89.00	9.78	1.85	5.40	0.342	88.16	9.00	1.75	4.81	0.363
	1000Mn+400Cu	92.66	10.37	1.95	5.56	0.350	87.16	8.51	1.83	5.00	0.366
	1000 Mn+500Zn +400Cu	81.66	8.98	1.37	4.50	0.304	77.50	8.00	1.33	4.30	0.309
	Mean	84.89	9.47	1.57	4.96	0.316	81.50	8.27	1.54	4.49	0.342
Chinese	(control)	45.40	9.88	1.23	5.00	0.246	60.10	8.33	1.11	4.53	0.245
	500 Zn	48.20	10.24	1.31	5.36	0.244	66.46	8.86	1.29	5.11	0.252
	400 Cu	54.63	10.37	1.45	5.50	0.263	70.46	8.80	1.36	5.20	0.261
	1000Mn	51.60	10.35	1.40	5.47	0.256	67.83	9.10	1.33	5.15	0.258
	1000Mn+500Zn	62.56	11.65	1.82	5.86	0.310	76.43	9.33	1.73	5.63	0.307
	500Zn+400Cu	52.63	10.70	1.60	5.62	0.284	71.75	9.16	1.50	5.32	0.281
	1000Mn+400Cu	57.36	10.65	1.70	5.80	0.293	74.33	9.20	1.52	5.40	0.281
	1000 Mn+500Zn +400Cu	47.50	9.90	1.20	5.21	0.230	62.26	8.83	1.25	5.10	0.245
	Mean	52.48	10.47	1.46	5.47	0.266	68.70	8.95	1.38	5.18	0.266
Average micronutrients	(control)	62.11	9.34	1.21	4.61	0.262	67.15	8.05	1.14	4.21	0.270
	500 Zn	65.13	9.50	1.35	5.01	0.269	72.56	8.46	1.34	4.72	0.283
	400 Cu	70.16	10.18	1.50	5.28	0.284	76.45	8.53	1.49	4.85	0.307
	1000Mn	67.80	9.91	1.45	5.20	0.278	73.70	8.63	1.44	4.80	0.300
	1000Mn+500Zn	73.88	10.65	1.77	5.60	0.316	80.33	8.88	1.72	5.13	0.335
	500Zn+400Cu	70.81	10.24	1.72	5.51	0.312	79.95	9.08	1.62	5.06	0.320
	1000Mn+400Cu	75.01	10.51	1.82	5.68	0.320	80.75	8.85	1.67	5.20	0.321
	1000 Mn+500Zn +400Cu	64.58	9.43	1.28	4.85	0.263	69.88	8.41	1.29	4.70	0.274
	Mean	68.70	10.47	1.46	5.47	0.266	74.33	8.95	1.52	5.40	0.281
L.S.D at 5%	Cultivar	1.65	0.19	0.04	0.04	0.006	2.07	0.35	0.02	0.04	0.007
	Micronutrients	2.52	0.33	0.03	0.05	0.006	2.75	0.27	0.03	0.03	0.005
	Interaction	3.56	0.47	0.04	0.07	0.080	N.S.	N.S.	0.04	0.04	0.007

Table 2: Continue.

Characters Treatments		2007/2008						2008/2009					
		Fresh weight/plant (g)			Dry weight/plant (g)			Fresh weight/plant (g)			Dry weight/plant (g)		
cultivars	Micronutrients (ppm)	Leaves	Bulb	Total	Leaves	Bulb	Total	Leaves	Bulb	Total	Leaves	Bulb	Total
Balady	(control)	26.74	34.16	60.90	4.93	9.21	14.14	25.66	35.22	60.88	5.65	8.70	14.35
	500 Zn	34.33	40.16	74.49	5.58	10.19	15.77	27.44	37.73	65.17	6.05	9.90	15.95
	400 Cu	38.33	42.58	80.91	6.45	13.00	19.45	30.99	37.49	68.48	6.93	12.42	19.35
	1000Mn	35.00	46.46	81.46	7.65	12.47	20.12	34.21	37.77	71.98	6.84	11.94	18.78
	1000Mn+500Zn	35.50	48.43	83.93	8.44	13.30	21.74	36.50	38.66	75.16	7.53	12.72	20.25
	500Zn+400Cu	44.50	50.93	95.43	9.51	13.63	23.14	46.44	47.66	94.10	10.22	13.29	23.51
	1000Mn+400Cu	45.83	52.33	98.16	9.55	14.00	23.55	42.50	39.50	82.00	8.85	13.34	22.19
	1000 Mn+500Zn +400Cu	50.33	39.16	96.49	7.20	11.25	18.45	26.47	36.27	62.74	6.27	10.88	17.15
Mean		36.32	44.28	80.60	7.41	12.13	19.54	33.77	38.79	72.56	7.29	11.64	18.93
Chinese	(control)	24.49	44.60	69.09	5.77	16.39	22.16	26.77	44.99	71.76	5.43	16.57	22.00
	500 Zn	26.33	50.50	76.83	6.17	20.79	26.96	30.55	49.42	79.97	6.93	20.13	27.06
	400 Cu	27.33	54.16	81.49	6.78	25.36	32.14	34.99	50.44	85.43	8.28	24.63	32.91
	1000Mn	27.66	56.16	83.82	6.56	24.23	30.79	33.88	49.99	83.87	7.94	23.65	31.59
	1000Mn+500Zn	32.83	67.50	100.33	8.40	29.23	37.63	41.88	54.44	96.32	9.91	29.63	39.54
	500Zn+400Cu	28.33	60.00	88.33	7.10	26.30	33.40	35.33	52.77	88.10	8.43	26.49	34.92
	1000Mn+400Cu	30.76	62.86	93.62	7.42	27.48	34.90	36.44	53.33	89.77	8.70	27.92	36.62
	1000 Mn+500Zn +400Cu	25.16	50.40	75.56	6.44	21.18	27.62	29.55	48.33	77.88	7.25	21.26	28.51
Mean		27.86	55.77	83.63	6.83	23.87	30.70	33.67	50.46	84.13	7.85	23.79	31.64
Average micronutrients	(control)	25.61	39.38	64.99	5.35	12.80	18.15	26.21	40.10	66.31	5.54	12.64	18.18
	500 Zn	30.33	45.33	75.66	5.87	15.49	21.36	28.99	43.57	72.56	6.49	15.01	21.50
	400 Cu	32.83	48.37	81.20	6.61	19.18	25.79	32.99	43.96	76.95	7.60	18.52	26.12
	1000Mn	31.33	51.31	82.64	7.10	18.35	25.45	34.04	43.88	77.92	7.39	17.79	25.18
	1000Mn+500Zn	34.16	57.96	92.12	8.42	21.26	29.68	39.19	46.55	85.74	8.72	21.17	29.89
	500Zn+400Cu	36.41	55.46	91.87	8.30	19.96	28.26	40.88	50.21	91.09	9.32	19.89	29.21
	1000Mn+400Cu	38.29	57.60	95.89	8.48	20.74	29.22	39.47	46.41	85.88	8.77	20.63	29.40
	1000 Mn+500Zn +400Cu	27.74	44.78	72.52	6.82	16.21	23.03	28.01	42.30	70.31	6.76	16.07	22.83
L.S.D at 5%	Cultivar	134	3.16	3.39	0.04	0.25	0.10	0.20	4.58	4.78	0.11	1.69	0.13
	Micronutrients	1.28	2.62	3.24	0.09	0.03	0.01	0.16	3.18	3.19	0.07	0.74	0.09
	Interaction	1.82	3.70	4.58	0.14	0.05	0.19	0.22	N.S.	4.51	0.09	1.05	0.14

Table 3: Effect of pre-planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on macro-elements content (mg/100g dry weight) of leaves and bulbs during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008						2008/2009					
Treatments		N		P		K		N		P		K	
cultivars	Micronutrients (ppm)	Leaves	Bulbs	Leaves	Bulbs	Leaves	Bulbs	Leaves	Bulbs	Leaves	Bulbs	Leaves	Bulbs
Balady	(control)	4100	3170	500	390	3620	3000	4100	3165	510	375	3650	2987
	500 Zn	4255	3335	570	435	3985	3240	4238	3300	557	428	3870	3200
	400 Cu	4500	3553	640	555	4100	3450	4475	3540	630	546	4085	3415
	1000Mn	4300	3405	606	472	4015	3295	4308	3392	590	460	3951	3270
	1000Mn+500Zn	4365	3440	625	500	4040	3335	4375	3445	610	480	3990	3300
	500Zn+400Cu	4435	3500	631	535	4063	3400	4330	3485	628	505	4050	3370
	1000Mn+400Cu	4550	3600	660	579	4130	3480	4430	3590	650	564	4100	3450
	1000 Mn+500Zn +400Cu	4205	3290	544	410	3965	3180	4180	3270	540	400	3810	3162
Mean		4338	3411	597	484	3989	3297	4304	3398	589	469	3938	3269
Chinese	(control)	4070	3100	476	365	3597	2989	4000	3122	430	342	3560	3000
	500 Zn	4210	3275	555	440	3870	3190	4159	3300	528	424	3855	3170
	400 Cu	4430	3510	633	540	4080	3380	4243	3410	573	470	3965	3258
	1000Mn	4270	3330	561	465	3915	3230	4193	3365	550	450	3920	3225
	1000Mn+500Zn	4480	3585	645	560	4110	3420	4395	3562	650	535	4075	3400
	500Zn+400Cu	4330	3400	580	495	3980	3278	4285	3450	515	490	3995	3300
	1000Mn+400Cu	4375	3460	600	525	4035	3325	4335	3497	625	513	4033	3355
	1000 Mn+500Zn +400Cu	4160	3240	530	412	3825	3160	4120	3258	510	402	3800	3138
Mean		4290	3362	572	475	3926	3246	4216	3370	547	453	3900	3230
Average micronutrients	(control)	4085	3135	488	377	3608	2994	4050	3143	470	358	3605	2993
	500 Zn	4232	3305	562	437	3927	3215	4198	3300	542	426	3862	3185
	400 Cu	4465	3531	636	547	4090	3415	4359	3475	601	508	4025	3336
	1000Mn	4285	3367	583	468	3965	3262	4250	3378	570	455	3935	3247
	1000Mn+500Zn	4422	3512	635	530	4075	3377	4385	3503	630	507	4032	3350
	500Zn+400Cu	4382	3450	605	515	4021	3339	4307	3467	571	497	4022	3335
	1000Mn+400Cu	4462	3530	630	552	4082	3402	4382	3543	637	538	4066	3402
	1000 Mn+500Zn +400Cu	4182	3265	537	411	3895	3170	4150	3264	525	401	3805	3150
L.S.D at 5%	Cultivar	6.1	7.3	4.8	4.9	10.0	3.4	6.6	8.1	2.1	2.8	8.5	7.8
	Micronutrients	8.8	10.6	4.5	5.6	6.3	6.5	8.1	9.2	5.0	5.6	7.5	7.6
	Interaction	12.4	15.0	6.4	7.9	8.9	9.1	11.5	13.1	7.2	8.1	10.5	10.6

Table 4: Effect of pre- planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on yield and its components during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008						2008/2009					
Treatments		Bulb		No. of cloves/ bulb	Fresh weight (g)		Total cured yield (ton/fed)	Bulb		No. of cloves/ bulb	Fresh weight (g)		Total cured yield (ton/fed)
cultivars	Micronutrients (ppm)	Fresh weight (g)	Dry weight (g)		Cloves	Clove		Fresh weight (g)	Dry weight (g)		Cloves	Clove	
Balady	(control)	41.52	22.18	27.72	36.86	1.33	6.170	37.23	21.25	28.42	32.96	1.16	6.050
	500 Zn	43.12	23.63	29.35	39.61	1.35	6.710	40.52	22.97	28.87	36.94	1.28	6.690
	400 Cu	50.53	25.72	30.57	45.85	1.50	7.760	44.64	25.00	29.15	37.89	1.30	7.000
	1000Mn	49.52	25.18	30.70	44.51	1.45	7.010	44.04	24.82	32.22	42.85	1.33	7.290
	1000Mn+500Zn	51.19	25.98	32.35	45.28	1.40	7.230	46.97	24.48	28.92	39.61	1.37	7.400
	500Zn+400Cu	51.85	26.28	32.84	48.27	1.47	8.130	50.12	25.32	31.91	46.58	1.46	7.970
	1000Mn+400Cu	54.07	26.88	32.34	46.89	1.45	7.420	47.65	24.50	30.23	42.92	1.42	7.760
	1000 Mn+500Zn +400Cu	46.90	23.98	28.36	37.99	1.34	6.450	43.39	23.42	28.77	35.00	1.22	6.340
Mean		48.59	24.97	30.52	43.16	1.41	7.110	44.32	23.97	29.81	39.34	1.32	7.063
Chinese	(control)	52.37	31.29	15.66	46.97	2.99	7.100	53.29	31.90	15.33	48.28	3.15	6.700
	500 Zn	61.89	33.59	16.02	56.06	3.50	7.620	55.25	34.00	16.15	52.80	3.27	7.260
	400 Cu	65.03	38.99	17.98	58.07	3.23	8.550	61.89	37.41	16.43	54.70	3.33	7.700
	1000Mn	64.09	37.75	15.62	51.85	3.32	7.810	60.60	37.15	15.82	53.47	3.38	7.430
	1000Mn+500Zn	68.75	42.52	16.33	60.74	3.72	8.850	70.93	42.94	16.53	63.41	3.84	8.520
	500Zn+400Cu	65.09	40.41	14.46	57.14	3.95	8.100	65.95	40.62	15.86	61.37	3.87	8.000
	1000Mn+400Cu	66.07	41.59	18.05	57.57	3.19	8.280	68.96	41.75	16.89	58.26	3.45	8.300
	1000 Mn+500Zn +400Cu	59.65	35.51	15.99	54.68	3.42	7.470	58.12	36.80	15.46	51.78	3.35	7.000
Mean		62.86	37.70	16.26	55.38	3.41	7.973	61.87	37.82	16.06	55.51	3.46	7.613
Average micronutrients	(control)	46.94	26.73	21.69	41.92	1.93	6.635	45.26	26.57	21.87	40.62	1.85	6.375
	500 Zn	52.50	28.61	22.68	47.84	2.11	7.165	47.88	28.48	22.51	44.87	1.99	6.975
	400 Cu	57.78	32.35	24.27	51.96	2.14	8.155	53.26	31.21	22.79	46.29	2.03	7.350
	1000Mn	56.80	31.46	23.16	48.18	2.08	7.409	52.32	30.98	24.02	48.16	2.00	7.361
	1000Mn+500Zn	59.97	34.25	24.34	53.01	2.18	8.040	58.95	33.71	22.73	51.51	2.27	7.960
	500Zn+400Cu	58.47	33.34	23.65	52.71	2.23	8.115	58.03	32.97	23.88	53.97	2.26	7.985
	1000Mn+400Cu	60.07	43.23	25.19	52.23	2.07	7.850	58.30	33.12	23.56	50.59	2.15	8.030
	1000 Mn+500Zn +400Cu	53.27	29.74	22.17	46.34	2.09	6.960	50.76	30.11	22.11	43.39	1.96	6.670
L.S.D at 5%	Cultivar	3.16	0.28	0.08	1.71	0.04	0.187	1.75	0.27	0.25	0.95	0.09	0.072
	Micronutrients	2.29	0.06	0.04	0.77	0.08	0.095	2.64	0.26	0.04	0.74	0.03	0.129
	Interaction	3.26	0.08	0.06	1.09	0.11	0.134	3.74	0.37	0.06	1.04	0.04	0.183

Table 7: Effect of pre-planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on weight loss percentage in storage periods (month) during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008						2008/2009					
Treatments		Storage period (month)						Storage period (month)					
cultivars	Micronutrients (ppm)	1	2	3	4	5	6	1	2	3	4	5	6
Balady	(control)	15.30	19.41	26.50	32.50	37.70	41.20	15.00	19.30	25.30	31.30	36.40	40.00
	500 Zn	12.90	16.00	21.70	27.20	30.35	33.25	13.10	16.60	21.10	26.50	31.50	34.50
	400 Cu	11.50	14.50	19.50	23.70	26.70	29.30	12.50	15.30	19.10	23.60	27.50	34.50
	1000Mn	14.50	18.00	24.10	27.30	34.60	38.20	14.00	17.50	23.20	28.60	33.40	36.80
	1000Mn+500Zn	14.30	17.60	23.55	29.35	33.45	37.00	13.85	17.17	22.67	28.07	32.90	36.00
	500Zn+400Cu	12.10	15.10	20.50	25.30	28.40	31.20	12.00	15.20	19.20	24.90	29.20	32.00
	1000Mn+400Cu	13.50	16.90	22.65	28.25	32.45	35.80	13.60	17.30	22.40	27.80	32.60	35.60
	1000 Mn+500Zn +400Cu	15.00	19.00	24.50	30.50	35.40	39.00	14.80	18.90	25.40	30.90	35.40	38.90
Mean		13.63	17.06	22.87	28.01	32.38	35.61	13.60	17.15	22.29	27.70	32.36	36.03
Chinese	(control)	12.50	15.50	20.20	25.90	32.10	36.10	13.30	16.60	21.60	28.00	31.50	34.40
	500 Zn	9.23	11.58	15.13	19.13	24.13	28.05	10.00	12.40	16.31	21.61	24.48	27.13
	400 Cu	7.65	9.75	12.95	16.60	21.10	24.60	8.35	10.45	13.95	18.65	20.75	23.70
	1000Mn	11.81	14.76	19.11	24.11	29.86	33.76	11.20	14.35	18.95	24.95	28.27	30.68
	1000Mn+500Zn	10.70	13.45	17.45	22.25	27.67	31.65	11.00	13.85	18.30	24.15	27.35	31.00
	500Zn+400Cu	8.50	10.70	14.10	18.10	23.00	26.65	9.80	12.10	15.80	20.80	23.30	26.10
	1000Mn+400Cu	10.00	12.55	16.38	20.88	26.03	29.78	10.40	12.95	17.05	22.80	25.80	29.50
	1000 Mn+500Zn +400Cu	12.00	14.90	19.4	24.80	34.80	34.90	12.50	15.60	20.45	26.65	30.10	33.01
Mean		10.29	12.89	16.84	21.47	26.83	30.68	10.81	13.53	17.80	23.45	26.44	29.44
Average micronutrients	(control)	13.90	17.45	23.35	29.20	34.90	38.65	14.15	17.95	23.45	29.65	33.95	37.20
	500 Zn	11.06	13.79	18.41	23.16	27.24	30.65	11.53	14.50	18.70	24.05	27.99	30.81
	400 Cu	9.57	12.12	16.22	20.15	23.90	26.95	10.42	12.87	16.52	21.12	24.12	29.10
	1000Mn	13.15	16.38	21.60	25.70	32.23	35.98	12.60	15.92	21.07	26.77	30.83	33.74
	1000Mn+500Zn	12.50	15.52	20.50	25.80	30.56	34.32	12.42	15.51	20.48	26.11	30.12	33.50
	500Zn+400Cu	10.30	12.90	17.30	21.70	25.70	28.92	10.90	13.65	17.50	22.85	26.25	29.05
	1000Mn+400Cu	11.75	14.72	19.51	24.56	29.24	32.79	12.00	15.12	19.72	25.30	29.20	32.55
	1000 Mn+500Zn +400Cu	13.50	16.95	21.95	27.65	33.10	36.95	13.65	17.25	22.92	28.77	32.75	35.95
L.S.D at 5%	Cultivar	0.08	0.09	0.10	0.11	0.09	0.03	0.04	0.06	0.08	0.15	0.09	0.06
	Micronutrients	0.06	0.06	0.05	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05
	Interaction	0.08	0.09	0.08	0.08	0.7	0.09	0.08	0.07	0.07	0.07	0.06	0.08

Table 8: Effect of pre-planting soaking cloves of Balady and Chinese CVs per-planting in solutions of Zn, Cu and Mn solely or in combination on infection and rot diseases percentage in stage period (month) during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008						2008/2009					
Treatments		Storage period (month)						Storage period (month)					
cultivars	Micronutrients (ppm)	1	2	3	4	5	6	1	2	3	4	5	6
Balady	(Control)	0	6.40	18.80	33.51	43.70	58.70	0	4.50	15.50	30.90	40.50	55.00
	500 Zn	0	2.50	9.00	16.00	30.00	37.00	0	2.00	8.00	13.00	25.00	36.00
	400 Cu	0	2.00	6.00	12.50	29.20	35.00	0	2.00	7.20	11.50	24.00	33.00
	1000Mn	0	5.58	16.00	28.20	39.50	54.50	0	4.60	13.80	26.00	37.70	52.00
	1000Mn+500Zn	0	3.70	10.50	20.30	34.00	44.00	0	3.00	12.00	20.00	30.00	45.00
	500Zn+400Cu	0	0.00	4.00	10.00	25.40	32.00	0	0.00	3.50	10.50	23.30	30.00
	1000Mn+400Cu	0	3.00	10.00	18.00	33.00	41.00	0	3.00	10.00	17.00	28.00	40.00
	1000 Mn+500Zn +400Cu	0	4.50	13.00	23.00	35.00	49.00	0	4.10	4.10	22.00	33.00	48.00
Mean		0	3.46	10.91	20.18	33.72	43.90	0	2.90	9.26	18.86	30.19	42.37
Chinese	(Control)	0	0	4.00	10.80	21.30	27.80	0	3.42	7.70	11.40	25.70	30.00
	500 Zn	0	0	3.00	7.00	17.30	22.00	0	2.50	5.45	9.70	22.70	26.00
	400 Cu	0	0	2.85	6.25	16.20	21.50	0	2.30	5.30	9.50	22.30	25.40
	1000Mn	0	0	3.70	9.70	20.60	26.50	0	3.30	7.10	11.00	24.50	29.00
	1000Mn+500Zn	0	0	3.50	8.10	19.40	24.00	0	3.00	6.00	10.10	23.60	27.00
	500Zn+400Cu	0	0	2.70	5.70	15.00	20.30	0	2.33	5.10	9.00	22.10	24.50
	1000Mn+400Cu	0	0	3.30	7.65	18.50	23.30	0	2.71	5.85	10.00	23.10	26.60
	1000 Mn+500Zn +400Cu	0	0	3.65	8.50	19.88	25.00	0	3.15	6.60	10.60	24.00	27.80
Mean		0	0	3.33	7.96	18.52	23.80	0	2.84	6.13	10.16	23.50	27.03
Average micronutrients	(Control)	0	3.20	11.40	22.12	32.50	43.25	0	3.96	11.60	21.15	33.10	42.50
	500 Zn	0	1.25	6.00	11.50	23.65	29.50	0	2.25	6.72	11.35	23.85	31.00
	400 Cu	0	1.00	4.42	9.37	22.70	28.25	0	2.15	6.25	10.50	23.15	29.20
	1000Mn	0	2.79	9.85	18.95	30.05	40.50	0	3.95	10.45	18.50	31.10	40.50
	1000Mn+500Zn	0	1.85	7.00	14.20	26.70	34.00	0	3.00	9.00	15.05	26.80	36.00
	500Zn+400Cu	0	0.00	3.35	7.85	20.20	26.15	0	1.16	4.30	9.75	22.70	27.25
	1000Mn+400Cu	0	1.50	6.65	12.82	25.75	32.15	0	2.86	7.92	13.50	25.55	33.30
	1000 Mn+500Zn +400Cu	0	2.25	8.32	15.75	27.44	37.00	0	3.62	5.35	16.30	28.50	37.90
L.S.D at 5%	Cultivar	-	0.12	0.10	0.22	0.19	0.15	-	0.22	0.07	0.11	1.79	0.24
	Micronutrients	-	0.06	0.06	0.01	0.07	0.05	-	0.17	0.05	0.07	1.71	0.02
	Interaction	-	0.08	0.08	0.02	0.04	0.08	-	0.73	0.08	0.09	2.42	0.03

Table 5: Effect of pre- planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on macro-elements and T.S.S. of cloves during 2007/2008 and 2008/2009 seasons.

Characters Treatments		2007/2008			T.S.S. (%)	2008/2009			T.S.S. (%)
		Macro-elements content (mg/100g dry weight)				Macro-elements content (mg/100g dry weight)			
cultivars	Micronutrients (ppm)	N	P	K		N	P	K	
Balady	(control)	3250	419	3100	21.57	3235	400	3087	21.36
	500 Zn	3460	519	3290	22.90	3435	513	3270	22.50
	400 Cu	3643	599	3490	25.50	3650	580	3460	24.80
	1000Mn	3500	539	3345	23.72	3482	522	3331	23.60
	1000Mn+500Zn	3552	559	3408	24.00	3548	550	3365	24.20
	500Zn+400Cu	3580	479	3473	24.70	3570	570	3400	24.50
	1000Mn+400Cu	3710	609	3520	26.30	3700	599	3500	25.90
	1000 Mn+500Zn +400Cu	3380	488	3235	22.45	3365	465	3195	22.10
Mean		3509	538	3357	23.89	3498	524	3326	23.62
Chinese	(control)	3175	380	3030	26.50	3200	370	3050	26.00
	500 Zn	3390	495	3230	27.61	3378	453	3220	27.30
	400 Cu	3590	569	3455	29.50	3482	490	3320	29.22
	1000Mn	3460	515	3300	28.46	3439	475	3275	28.30
	1000Mn+500Zn	3640	595	3500	30.92	3611	570	3470	30.70
	500Zn+400Cu	3500	539	3350	29.63	3530	515	3361	29.31
	1000Mn+400Cu	3560	555	3395	30.55	3571	548	3410	30.15
	1000 Mn+500Zn +400Cu	3350	472	3200	27.50	3332	432	3180	27.34
Mean		3458	515	3307	28.83	3442	481	3285	28.54
Average micronutrients	(control)	3212	399	3065	24.03	3217	385	3068	23.68
	500 Zn	3425	507	3260	25.25	3406	483	3245	24.90
	400 Cu	3616	584	3472	27.50	3566	535	3390	27.01
	1000Mn	3480	527	3322	26.09	3460	498	3303	25.95
	1000Mn+500Zn	3596	577	3454	27.46	3579	560	3417	27.45
	500Zn+400Cu	3540	559	3411	27.16	3550	542	3380	26.90
	1000Mn+400Cu	3635	582	3457	28.42	3635	573	3455	28.02
	1000 Mn+500Zn +400Cu	3365	480	3217	24.97	3348	448	3187	24.72
L.S.D at 5%	Cultivar	5.4	9.2	11.6	0.05	1.8	5.5	1.6	0.02
	Micronutrients	9.9	5.2	7.5	0.05	7.2	6.4	7.7	0.03
	Interaction	14.1	7.4	10.6	0.07	10.2	9.0	10.9	0.08

Table 6: Effect of pre-planting soaking cloves of Balady and Chinese CVs in solutions of Zn, Cu and Mn solely or in combination on micro-elements and total carbohydrates of cloves during 2007/2008 and 2008/2009 seasons.

Characters		2007/2008			Carbohydrates (%)	2008/2009			Carbohydrates (%)
Treatments		Micro-elements content (ppm)				Micro-elements content(ppm)			
cultivars	Micronutrients (ppm)	Mn	Zn	Cu		Mn	Zn	Cu	
Balady	(control)	295	390	73	30.00	280	372	67	26.50
	500 Zn	330	6 75	100	33.00	313	650	98	32.00
	400 Cu	352	500	190	35.60	345	470	175	35.00
	1000Mn	579	510	130	33.50	571	480	115	33.00
	1000Mn+500Zn	562	690	170	36.30	562	670	145	35.00
	500Zn+400Cu	510	680	220	34.80	510	665	207	32.70
	1000Mn+400Cu	585	650	240	36.50	585	635	215	35.30
	1000 Mn+500Zn +400Cu	400	430	130	32.00	400	422	117	31.40
Mean		451	565	156	33.96	445	545	142	32.98
Chinese	(control)	250	300	25	27.50	245	270	23	26.00
	500 Zn	310	590	85	29.00	300	570	80	27.90
	400 Cu	340	460	175	31.10	335	435	151	30.00
	1000Mn	540	500	100	28.80	518	512	90	27.30
	1000Mn+500Zn	530	630	155	32.50	515	600	138	31.10
	500Zn+400Cu	475	610	200	29.70	450	580	185	28.60
	1000Mn+400Cu	560	570	225	30.50	543	545	200	29.40
	1000 Mn+500Zn +400Cu	370	410	100	28.30	365	397	90	27.00
Mean		421	508	133	29.67	408	488	119	28.41
Average micronutrients	(control)	272	345	49	28.75	262	321	45	27.76
	500 Zn	320	631	92	31.00	306	609	89	29.95
	400 Cu	346	480	182	33.35	340	452	163	32.51
	1000Mn	559	505	115	31.15	544	496	102	30.15
	1000Mn+500Zn	546	658	162	34.40	538	634	141	33.06
	500Zn+400Cu	492	644	210	32.25	480	620	196	30.65
	1000Mn+400Cu	572	611	232	33.50	564	594	207	32.36
	1000 Mn+500Zn +400Cu	385	420	115	30.15	382	409	103	29.20
L.S.D at 5%	Cultivar	4.4	10.1	3.0	0.34	6.1	6.1	5.8	0.19
	Micronutrients	6.1	11.8	5.7	0.37	7.1	7.1	5.6	0.33
	Interaction	8.6	16.6	8.0	0.52	10.0	9.9	7.9	0.47