genetic variability. Conversely, the variance increases with the complementary gene action. The similar signs of (h) and (l) indicated the presence of complementary gene action. In the case where all the three types of gene effects (additive, dominance and epistatic) were significant, the suitable breeding methods might be recurrent selection procedures to exploit all the three types of gene effects. Simultaneously as under such a situation breeding for homozygous lines in wheat by a routine pedigre method would mean only partial exploited of genetic variance.

The crosses, CPAN 1962 x CC 493 and WH 147 x CPAN 1874 having high means, additive and additive x additive gene effects for grain yield/plant and its components may provide better opportunities for improvement through simple selection procedures.

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EFFECT OF MID-STORAGE TREATMENT ON STORAGE LIFE OF TOMATO AND BRINJAL

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ABSTRACT

Eight month old seeds of tomato (cv. Co 3) and brinjal (cv. Annamalai) were given the hydration-dehydration treatment with water and different anti-oxidants. The treated seeds after dehydration were stored in ambient condition along with control and evaluated for the seed quality parameters at bimonthly interval. Among the treatments, the disodium phosphate (10^{-4}m) recorded higher germination and drymatter production in both tomato and brinjal even after eight months of storage. The treated seeds recorded lower electrical conductivity and higher dehydrogenase activity.

KEY WORDS : Tomato, Brinjal, Seeds, Storage Life, Mid storage Treatments

In the hot and humid climatic conditions of India, maintenance of vigour and viability of seeds, especially of carryover stock, under ambient storage is the main problem. Maintenance of good germinability of the seed would, therefore, be of considerable advantage to the farmers who are facing acute shortage of good seed. Attempts have been made to evaluate the effectiveness of the hydration-dehydration treatment to prolong the shelf life of tomato and brinjal seeds under storage.

MATERIALS AND METHODS

Harvest fresh seeds of tomato (cv. Co 3) and brinjal (cv.Annamalai) obtained from the Vegetable Research Station, Tamil Nadu Agricultural Universtiy, Palur were stored under

Table 1. Effect of mid-storage treatment with different chemicals on seed quality in tomato (cv.CO 3) under storage

Treatments	Initial					Eight months after treatment				
	Germination (%)	DMP (mg/seedling)	EC (ds m^{-1})	Sugar (µg)	Dehydrogenase activity (O.D. value)	Germination (%)	DMP (mg/seedling)	EC (ds m^{-1})	Sugar (µg)	Dehydrogenase activity (O.D. value)
Control	73	2.0	0.037	19	0.090	34	1.2	0.080	70	0.020
Sodium chloride	75	2.1	0.035	19	0.0.95	40	1.5	0.065	60	0.040
Sodium thio-sulphate	76	2.1	0.035	19	0.100	40	1.6	0.065	58	0.055
Disodium phosphate	76	2.2	0.037	17	0.120	52	1.6	0.060	54	0.065
Water	76	1.9	0.034	17	0.090	46	1.5	0.063	62	0.045
p-amino benzoic acid	73	1.9	0.031	16	0.095	45	1.4	0.063	59	0.035
p-hydroxy benzoic acid	75	2.1	0.032	17	0.110	45	1.5	0.063	59	0.045
Neem kernel extract	74	1.9	0.038	18	0.105	46	1.4	0.064	65	0.040

CD (P=0.05)	G	DMP	EC	Sugar	Dehydrogenase
Treatment	2.02	0.08	0.0011	2.22	0.012
Period	1.60	0.06	0.0009	1.76	0.007
T x P	NS	0.17	0.0025	4.98	NS

DMP : Dry matter production; EC : Electrical conductivity

ambient condition in the laboratory during 1994. After eight-months of storage, the seeds were given hydration-dehydration treatment by soaking for 6h in water and dilute solutions of sodium chloride (10^{-4}m), sodium thiosulphate (10^{-4}m), disodium phosphate (10^{-4}m), p-amino benzoic acid (10^{-4}m), p-hydroxy benzoic acid (10^{-5}m) and neem kernel extract (5%). Seed samples were drawn at bimonthly intervals and evaluated for seed quality parameters *viz.*; germination (ISTA, 1985), drymatter production, (DMP), electrical conductivity (EC) (Presley, 1958), sugar (Somogyi, 1952) and dehydrogenase activity (Kittock and Law, 1968).

RESULTS AND DISCUSSION

The hydration-dehydration seed treatment was found to be highly effective in controlling seed deterioration. Invariably the treated seed

Table 2. Effect of mid-storage treatment with different chemicals on seed quality in brinjal (cv.Annamalai) under storage

Treatments	Initial					Eight months after treatment				
	Germination (%)	DMP (mg/seedling)	EC (ds m^{-1})	Sugar (µg)	Dehydrogenase activity (O.D. value)	Germination (%)	DMP (mg/seedling)	EC (ds m^{-1})	Sugar (µg)	Dehydrogenase activity (O.D. value)
Control	75	2.0	0.035	13	0.070	48	1.0	0.068	65	0.025
Sodium chloride	77	1.9	0.034	14	0.075	55	1.2	0.064	56	0.040
Sodium thio-sulphate	76	1.9	0.034	13	0.080	56	1.0	0.061	55	0.040
Disodium phosphate	78	2.0	0.033	12	0.080	58	1.4	0.055	53	0.050
Water	76	1.9	0.032	13	0.065	52	1.2	0.058	64	0.035
p-amino benzoic acid	76	1.9	0.033	15	0.070	57	1.0	0.062	62	0.045
p-hydroxy benzoic acid	77	1.9	0.031	13	0.075	52	1.3	0.058	58	0.045
Neem kernel extract	75	1.9	0.032	13	0.075	53	1.2	0.060	64	0.045

CD (P=0.05)	G	DMP	EC	Sugar	Dehydrogenase
Treatment	1.10	0.04	0.0011	1.97	0.016
Period	0.87	0.05	0.0009	1.63	0.012
T x P	2.46	0.08	0.0026	4.61	NS

DMP : Dry matter production; EC : Electrical conductivity

maintained higher germination, and vigour over the untreated seeds in both tomato and brinjal (Tables 1,2). Among the treatments, disodium phosphate (10^{-4}m) recorded higher germination in tomato (52%) and in brinjal (58%) at the end of eight months of storage. It could be attributed that the anti-oxidant property of the disodium phosphate would have controlled the free radical damage and maintained the membrane integrity. Similar study with disodium phosphate was reported in tomato earlier (Sree Ramamurthy, 1984). Treatment with disodium phosphate showed significant improvement in DMP, but the response to treatment was comparatively higher in tomato (19%), than in brinjal (13%) and this might be due to the repair of damage in bioorganelles (Villiers, 1975). Seeds treated with disodium phosphate recorded lower EC and free sugars of seed leachate. The membrane damage due to destructive changes during seed ageing could be repaired and protected by the hydration-dehydration treatment (Basu *et al*., 1975). In this study, the enzymatic activity was more in the seeds treated with disodium phosphate, confirming the finding of Dey and Mukherjee (1986) in mustard. In may be concluded that mid-storage treatment given to eight month old seeds, particularly with disodium phosphate @ 10^{-4}m significantly reduced the deterioration of seeds under storage.

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BIOLOGICAL AND ECONOMIC INDICES FOR MEASURING RESOURCE UTILISATION IN MAIZE-SOYBEAN INTERCROPPING SYSTEM

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ABSTRACT

Experiments were conducted at the Tamil Nadu Agricultural University, Coimbatore to assess the biological and economic advantages of maize-soybean intercropping system under varying levels of irrigation and nitrogen during summer and *kharif* seasons of 1990. Though, land equivalent ratio (LER) recorded a positive value under varying levels of intercrops, irrigation and nitrogen, the land equivalent coefficient (LEC) showed its superiority in measuring the competition aspects in intercropping. The monetary equivalent ratio (MER) was modified with a new concept called net monetary equivalent ratio (NMER) by accounting the net returns for computing the economic efficiency in intercropping studies. Both biological and economic indices revealed that two rows of intercrop soybean was essential for effective utilisation of resources and for better economic output.

KEY WORDS : Maize, Soybean, Intercropping, LER, LEC, MER, NMER

In terms of land use, growing crops in mixed stand is regarded as more productive than growing them separately. Intercropping is practiced widely throughout the tropics and is an advantageous