ght of seed exerted the maximum indirect ct via fruit number on the fruit weight vice-versa (Table 2). The results of direct indirect effects at genotypic levels also wed the similar trend at phenotyic levels. nace content and fruit diameter exerted imum direct effect on fruit weight at genotypic l. The fruit diameter, fruit length, pomace ent, weight of individual seed and seed fruit influenced the fruit weight via-fruit ber at genotypic level, while direct and rect effects of other characters on fruit ght were of very low magnitude. The direct ct on such characters on fruit weight was observed by Sena *et al.* (1993) in Cashewnut. the basis of correlation and path analysis, an be concluded that the selection based fruit diameter and fruit length and pomace ent of individual fruit would be helpful he selection of best types in Karonda.

erences

gwat, N.R. (1984). Studies on flowering and fruiting in Karonda (*Carissa carandas* L.) M.Sc. (Agri.) Thesis, Konkan Krishi Vidhyapeeth, Dapoli, India.

Cooke, C.T. (1904). Flora of precidancy of Bombay, Vol-II, Botanical survey of India, Calcutta: 186.

Dewey, D.R. and Lu, R.H. (1959). A correlation and path analysis. Components of crested wheat grass seed production. *Agron. J.* 515-518.

Dhumal, S.A., Patil, S.D. and Jadha, M.G. (1993) Studies on variability and correlation analysis in fruit characters in Karonda. *J. Maharastra Agri. Univ.* **18**: 498-99.

Johnson, H.W., Robinson, H.T. and Comstock, R.E. (1956). Genotypic and phenotypic correlation in soyabean and their implication in selection. *Agron. J.* **47**: 477-483.

Joshi, G.D., Prabhudesai, V.G. and Salve, M.G. (1986). Physico-chemical characters of Karonda (*Carissa carandas* L.). *Maharashtra J. Hort.* **3**: 39-44.

Ranpise, S.A. and Desai, U.T. (1994). Genotypic and phenotypic correlation in acid lime. *South Indian Hort.* **42**: 133-136.

Sena, D.K., Lenka, P.C., Jagadev, P.N. and Baura Sashikala (1994). Genetic variability in association in cashew nut. *India J. Genet.* **54**: 304-309.

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Research Notes

ortification of tomato seeds to augment seedling vigour

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The increase in seed yield indicates the pe for further rationalizing the nutrients for cient production pattern at various stages growth and flower production for obtaining gher seed yield.

Among the popular vegetables, tomato *ycopersicon esculentum*), ranks first with respect food value and taste. Tomato is graded perior because of its higher contents of vitamin B, C and calcium. The production of tomato is been hampered severely due to lack of ality seeds and proper soil management and prevalence of disease infestation. Thus, an attempt was made to improve the seedling vigour through fortification with micronutrients may result in a good field emergence and pave way for harvesting higher yield.

Fresh seeds of tomato PKM-1 were fortified using optimum quantity of water as well as nutrient solutions at 1:1 ratio on weight/volume basis for 16 hours under room temperature. The chemicals used were combination of sodium dihydrogen phosphate (0.5%) and potassium orthophosphate (0.5%) in 1:1 proportion on

Table 1. Effect of Nutrient fortification of Tomato seeds (PKM-1) and their seedling characters

Treatment	Laboratory evaluation 12 days - old seedling				Nursery condition 30 - days old seedling			
	Germ (%)	Root length (cm)	Shoot length (cm)	Vigour Index	Root length (cm)	Shoot length (cm)	No.of leaves	Seedling dry wg. G/10 seedlings
Control	78 (62.04)	5.7	4.1	388	4.6	10.8	3.4	3.017
Water	73 (59.69)	6.5	3.6	250	5.1	11.2	3.5	3.170
Sodium and Potassium Phosphate (0.5%)	91 (73.07)	6.9	4.2	463	9.9	24.6	7.0	4.013
Sulphate solutions of Mg, Mn, Zn and K	69 (57.37)	4.6	3.5	335	9.6	20.9	7.7	4.000
Phosphate + Sulphate solution	61 (51.53)	5.8	3.9	408	8.2	16.4	5.2	3.680
CD (P=0.05)	12.96	N.S.	0.47	-	1.09	2.8	0.97	0.607

volume by volume basis, an equivolume mixture of sulphate solutions of magnesium, manganese, zinc and potassium (each 0.5%) and combination of phosphate and sulphate solutions in 1:1 proportion. The fortified seeds were air-dried prior to sowing. The treated seeds were evaluated for germination and vigour under laboratory and nursery conditions in four replications. Seedling evaluation were carried out on 12th and 20th day of sowing in both lab and nursery conditions respectively.

Evaluation of germination potential and seedling growth revealed significant differences due to treatment. Seeds fortified with sodium and potassium phosphate solutions showed higher germination of 91 per cent and vigour (468). Rahman *et al.* (1996) observed increased germination percentage and thousand seed weight in tomato due to nutrient management. Manjunatha Reddy and Kulkarni (1986) also observed increased seed setting percentage and reduced number of ungerminated seeds in alfalfa due to micro nutrient application. The growth measurements and dry matter production of 30 day old seedlings also showed significant differences due to the treatments. Seeds fortified with sodium and potassium phosphate solution registered more root (9.9 cm) and shoot length (24.6 cm) and dry matter production of the seedling (4.01 g per 10 seedlings) followed by seeds fortified with sulphate combinations under nursery conditions.

The irrigation effects of fortified seed enhanced vigorous seedling growth thereby, it attained the transplanting stage atleast one week earlier. Hence fortification of tomato seeds with 0.5 per cent solution of sodium and potassium phosphates mixed in 1:1 ratio was found useful for getting vigorous seedling which presumably would influence the growth and yield potential of the resultant crop. Similar results were reported by Gill *et al.* (1995) in radish.

Referenes

Gill, S.S., Gill, B.S., Brar, S.P.S. and Balwinder Singh (1995). Nitrogen and Phosphorous requirement of radhish crop. *Seed Res.* **23**: 47-49.

Manjunatha Reddy, B.P. and Kulkarni, G.N. (1986). Influence of foliar spray of Zinc and Iron on pollen affectin seed yield in alfalfa. *Seed Res.* **14**: 185-188.

Rahman, M., Farid, A.T.M., Shahidullah, M. and Sultana W. (1996). Improving seed yield and quality of tomato through integrated nutrient management and liming. *Seed Res.* **24**: 34-37.

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