From the study of the crosses, types M. C. 6 (Pattambi Green), M. C. 16 (Nandyal), M. C. 20 (Kasargod) and M. C. 26 (Coimbatore short) appeared suitable for producing useful hybrids. Crosses in which the first two were used as female parents and the other two as male parents were found to be more promising than the others. The hybrids were compared with the selfed progenies of the parents and they were observed to have longer and thicker fruits than the parents.

5. **Conclusions:** The preliminary observations have shown the possibility of evolving new and better yield types of bitter gourd by careful selection and hybridisation. These aspects will have to be studied in more detail to find out the extent to which improvement in this vegetable crop can be effected.

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Seed Viability Test with 2, 3, 5 Tri-Phenyl Tetrazolium Chloride

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In 1941 Kuhn and Jerchel (6) drew attention to the properties of colourless tetrazolium salts which get reduced by some phytochemical process to stable red formosans on contact with the tissues of embryos of viable seeds and suggested their use as reduction indicators of living tissues. Since then, the test has been in use in German Breeding Stations for testing viability in oats.

Lakon (7) gave up his erstwhile 'topographical method' of determining seed viability with selenium salts in preference to 2, 3, 5 triphenyl tetrazolium chloride. Cottrell (2) Porter and his colleagues (8) have confirmed the reliability of these tests with several cereals; but do not recommend their use with minute seeds, as the staining is not clearly

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perceptible. Goodsell (4) found the method unreliable with immature seeds. Bennett and Loomis (1) have, however, indicated that this test provides a rapid means of testing frost injury in corn in 24 hours instead of one or two weeks. Hyde (5) noted that the germinating capacity of Fescue seed could be rapidly estimated with less than 5 per cent error. Flemion and Poole (3) and Shuel (9) found significant correlations with the rapid viability test and ordinary tests.

Trials were conducted in the Agricultural College, Bapatla with 2, 3, 5 triphenyl tetrazolium chloride on several seeds to assess the efficacy of this method of testing viability of seeds of crop plants.

5 c.c. of one percent solution of tetrazolium chloride was added 24 hours after moistening and the viable crop seeds were kept at freezing point in an Electrolux refrigerator. None of the embryos reacted to the salt even after a week's storage. The seeds lost viability and consequently failed to show any reaction. Similarly seeds boiled in water developed no stain. Beyond 5°C deep pink staining of the embryos was visible in viable seeds, within 24 hours of addition of the salt. The stain remained stable even after washing, alternate drying or soaking treatments. To assess the optimum range, different concentrations of tetrazolium chloride were used with G.E.B. 24 strain of paddy and the results are presented below :—

Concentration in p. p. m,	Concentration as percentage	Percentage stained	Percentage of germination	Remarks.
100 p. p. m.	0·01	38	100	Very light pink.
250 ,,	0·025	59	100	,,
500 ,,	0·05	95	100	Light pink.
750 ,,	0·075	98	100	Pink.
1000 ,,	0·10	100	100	Deep pink.
2000 ,,	0·20	100	100	Very deep pink.
5000 ,,	0·50	100	100	Very deep pink.
10,000 ,,	1·00	100	100	Intense pink.

With increase in concentration, the intensity of stain and the percentage of embryos stained is found to increase upto 1000 p.p.m. or with 0·1 per cent of tetrazolium chloride. The degree of staining does not differ beyond this level and the optimum is found to range between 0·05 to 0·1 per cent.

Further tests were carried out with 2 c.c. of 0·1 per cent of tetrazolium chloride with several freshly harvested strains of paddy, dehusked

and previously soaked with water adequate to moisten the seeds and the count of stained seeds with their actual germination is furnished below :—

Strain	Percentage of embryos stained. Deep.	Medium.	Light.	Percentage germination.
G. E. B. 24–Kichili samba	98	1	...	100
A. K. P. 4 Mypali	100	...	...	100
S. L. O. 16 Kasipichodi	87	2	...	85
M. T. U. 7 Guttikusuma	87	...	...	85
S. R. 26–B.	59	5	1	62
C. O. 4 Gobi Anaikomban	98	...	1	69
A. D. T. 22 Vadan Samba	98	1	...	99
B. C. P. 1. Molugolukulu	97	1	1	98

Similar tests carried out with over 30 strains of paddy gave significant correlations with less than 5 per cent error between actual germination and the number of embryos stained with tetrazolium chloride. In case of doubt the grain had to be peeled for examination of the stain developed by the embryo.

The results obtained with similar tests conducted with other monocotyledonous grains and dicotyledonous seeds are given below:—

Name of crop.	Percentage stained. Deep.	Medium.	Light.	Persentage of germination.
Sorghum *(Sorghum durra)*	99	...	1	100
Ragi *(Eleusine coracana)*	100	...	...	100
Samai *(Panicum miliare)*	96	3	...	95
Tenai *(Setaria italica)*	99	...	...	100
Kudiaivali *(Echinochloa frumentacea)*	96	2	2	98
Varagu *(Paspalum scrobiculatum)*	95	3	2	99
Panivaragu *(Panicum miliaceum)*	98	1	1	100
Dicotyledonous seeds.				
Cowpea *(Vigna catjang)*	98	2	...	90
,, ,, No. 419.	11	7	2	10
Bengal gram *(Cicer arietinum)*	79	9	12	89
Pillipesara *(Phaseolus trilobus)*	99	1	...	94
Green gram *(Phaseolus radiatus)*	89	8	3	87
Red gram *(Cajanus cajan)*	96	4	6	100
Groundnut *(Arachis hypogea)*	89	7	4	98
Indigo *(Tephrosia purpurea)*	87	8	...	64
Dhaincha *(Sesbania aculeata)*	91	6	3	86

With millets and paddy the results obtained showed significant correlations between actual germination and the number of embryos stained, indicating that the test is fairly reliable with monocotyledonous seeds. In dicotyledonous seeds, the cotyledons developed light pink to deep pink colour irrespective of the viability of the seed. The counts of stained seeds did not correspond with actual seed germination and in several cases the differences were very large and significant. The method is found unsuitable for dicotyledonous seeds for critical assessment of seed viability.

This method of assessing seed viability is capable of exploitation in cereals which include the major food crops. Marketing, grading and storage depend on seed germinability. In this sphere tetrazolium chloride test is an aid to forecast fairly accurately, the seed viability even in the dormant stage of the grain, and thereby assist seed procurement and distribution.

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A Cheap Device for a Cool Chamber.

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The need for preserving fungal cultures in cool chambers needs no emphasis. In some of the moffussil research stations where neither electricity nor refrigerators are available the maintenance of cultures particularly in the summer months is difficult. Some cheap and efficient devices without the use of ice or refrigerator were tested. The following device described in brief was found to be of very helpful.