Effect on normal seedlings of different containers, genotypes and fungicidal trea...

Effect on normal seedlings of different containers, genotypes and fungicidal treatments during storage in rice

ABSTRACT

The experiments were conducted in the Laboratory to evaluate the effect of two containers (cotton bag and 700 gauge polythene bag), five genotypes of rice (CMS 58025 A, CMS 58025 B, KMR-3, IR-66 and Pant Dhan-11) and fungicidal treatments (Thiram, Thiram + Bavistin, Bavistin, Captan Vitavax, Chlorothalonil and Contaf on normal seedlings during storage (January to May) in rice. The packaging material cotton bags and 700 gauge polythene bags were found same for storage of seeds. In both containers, per cent normal seedlings were statistically at par in all the genotypes containing 12% moisture content. In all the genotypes there has been reduction in germination with the increase in storage period. The per cent normal seedlings were found maximum, after storage in restorer KMR-3 followed by IR-66 and variety Pant Dhan-11. In all the genotypes, different fungicides improved seed germination increased normal seedlings per cent. The individual effect of fungicides indicates that Thiram was most effective and yielded maximum percentage of normal seedling followed by Thiram + Bavistin. As per the cumulative effect is concern KMR-3 resulted more normal seedlings in both containers when treated with Thiram.

KEY WORDS: Normal Seedlings, Rice, Containers, Genotypes, Fungicidal treatments, Storage period

INTRODUCTION

Rice (*Oryza sativa* L) is one of the most important cereal crops for human consumption all over the world. In India, rice is grown on a very large area. For rice cultivation, the seed is a very important input. The rice seeds are required to be store for sowing in the next season after a time gap of six months or one year (Padhi *et al.* 2017). For the farmers and seed industry storage of seeds till the next sowing season is an important aspect. The deterioration on seed starts immediately after maturity in terms of reduction in seed germination, normal seedlings, viability and vigour. Stored seeds viability and vigour depends on the seed quality, genotypes, seed treatment, packing materials and storage conditions. For reducing the financial losses which is caused by due to non-selling of the seed in one season and have to store for the next season, the knowledge of storage of seed is very essential. There are many factors which affect the seed quality and cause deterioration during storage. Containers, genotypes and fungicidal treatment play a very important role during storage (Singh and Vishunavat 2019). The present investigation was carried out to find out the effect of containers, genotypes, fungicidal treatments and their combined effect on normal seedling during storage in rice.

Materials and Methods

The seeds of hybrid rice parents; CMS 58025 A, CMS 58025 B, IR- 66, KMR-3 and a variety Pant Dhan-11 were collected from the Crop Research Centre, G. B. Pant University of Agriculture and Technology, Pantnagar (UK), India showing varying degree of infection of various diseases in rice under field conditions. The seed were sum dried to bring down the moisture to 12% before storage. The seeds treated @ 2 gm/kg seed with Thiram (T1); Thiram

+ Bavistin (T2); Bavistin (T3); Captan (T4); Vitavax (T5), Chlorothalonil (T6); and Contaf (T8) as well untreated seeds of genotypes *viz.* CMS 58025 A, CMS 58025 B, IR- 66, KMR-3 and a variety Pant Dhan -11were divided into two lots and were stored in two types of containers viz. Cotton bags (C1) and Polythene bags of 700-gauge (C2) at room temperature for further studies. The observations were recorded at monthly intervals on normal seedlings.

Normal seedlings

A proportionate root and shoot length are considered to be normal seedlings. Normal seedlings show continued development into a satisfactory plant with all their essential structures well developed.

Germination test

Germination test was conducted to take the observations on normal seedlings. The tests were carried out using “ Towel Paper Method”. Two Towel paper (L×B) were soaked in running water overnight. Four hundred seeds for each treatment were used in the replication for 100 seeds. Twenty five seeds per towel paper were seeded and rolled using butter paper at the top. These rolled towel papers were placed in an incubator at 20-30° C in inclined position for 14 days. After 14 days, germination counts were made for normal seedlings and results are statistically analyzed for presenting the data (ISTA 1996).

Results and Discussion

Table 1 indicates that with an increase in storage period there has been decrease in per cent normal seedlings in both types of containers C_1 and C_2. Container C_1 retained more percentage of normal seedlings at different storage periods from January to May as compared to C_2 , although, these has not been significant difference in per cent normal seedlings in seeds stored in both of containers. The results are in accordance with Kaur et al. (1990) who also reported maximum germination retention in the seeds stored in 700 gauge polyline bags. Choudhury *et al.* (2011) also reported that rice seeds stored in polythene bags had higher seed germination. Padhi *et al.* observed that seeds of paddy stored in 700 gauge polythene bags maintained more germination percentage during storage.

Table 2 indicates that with an increase in storage period, the per cent normal seedlings decrease in all the genotypes. Maximum normal seedlings were recorded in genotype G4 in January (84. 74%) while the minimum per cent normal seedlings were recorded in G 2 (67. 92%) at same period of storage. The same trend has been observed as regard to per cent normal seedling further at different storage months, thus the maximum per cent normal seedlings were recorded in G4 followed by G3, G5 and G2, while minimum normal seedlings were recorded in G1. Kalavathi *et al.* (1989) evaluated A lines and their maintainer lines, restorers and their resultant F_1 hybrids and reported that IR 150 R followed by IR 101-98/96-2R as good storer and IR 58025 A found a poor storer. Rapid decrease in seed germinability in CMS line during storage was also reported by Duan and Ma (1992). Chang (1993) also reported that viability and vigour of hybrid rice seeds decreased more rapidly as compared to common cultivars, during storage. Deshpande and

Mahadevappa (1994) reported germinability decrease in storage period while carrying out the storage studied with restorers of hybrid rice.

The maximum percentage of normal seedlings were recorded in T1 whereas the minimum normal seedlings were observed in T8 with the increase in storage period per cent normal seedling decreased irrespective of different seed treatments. At all the storage periods, treatments T1 and T2 proved to be the best and maintained maximum percentage of normal seedlings. Treatments T3, T4, T5, T6 and T7 also improved percentage normal seedlings during storage as compared to check but were inferior to T1 and T2 (Table 3). Asalmol and Zade (1994) studied the effect of pre-storage seed treatment with Thiram and found the fungicide effective against fast deterioration of seed quality. Sharma and Chahal (1996) concluded that Bavistin + Thiram effectively controlled the seed borne pathogens. Moon *et al.* (2011) reported that seeds treated with Thiram+ Bavistin had higher seed germination and seedling length. Jyoti *et al.* (2017) reported that seed stored with treatment of Thiram proved superior as it maintained good and maximum seedling length in rice during storage. Choudhury *et al. (* 2011) observed that rice seeds treated with Thiram+ Bavistin had higher germination and seedlings length during storage. Padhi *et al.* (2017) concluded that rice seed treated with Thiram can maintain higher germinability for longer period.

Table 4 indicates that genotypes G3, G4 and G5 in C1 and C2 containers with treatments T1 and T2 retained maximum percentage of normal seedlings and proved to be the best at all the storage periods. Genotypes G1 and G2 in containers C1 and C2 with all treatments improved percentage of normal

seedlings as compared to checks but gave minimum percentage of normal seedlings as compared to rest of the genotypes, containers and treatment combinations (Table 4).

Conclusion

The present study indicates that seed stored in cotton bags and 700 gauge polyline bags are statistically at par in relation to normal seedlings in all the genotypes. The maximum normal seedlings were maintained in KMR-3, while minimum were in CMS 58025 A and CMS 58025 B in all storage period. At all the storage periods, Thiram followed by Thiram+ Bavastin proved to be the best and maintained maximum percentage of normal seedlings.

Table 1: Effect of different containers on per cent normal seedlings at different storage period in rice

Containers	Storage Period				
	January	February	March	April	May
C_1	77. 63 (62. 30)	75. 47 (60. 74)	73. 75 (59. 53)	71. 13 (57. 76)	69. 68 (56. 81)
C_2	79. 93	74. 97	73. 22	71. 82	68. 85

	(61. 76)	(60. 35)	(59. 14)	(58. 24)	(56. 27)
CD at 5%	0. 99	0. 90	0. 80	0. 73	0. 61

Table 2: Effect of different genotypes on per cent normal seedlings at different storage period in rice

Genotypes	Storage Period				
	January	February	March	April	May
G_1	68. 79 (56. 16)	64. 45 (54. 67)	64. 96 (53. 76)	63. 17 (52. 66)	61. 50 (51. 67)
G_2	67. 92 (55. 56)	66. 04 (54. 43)	63. 96 (53. 16)	61. 33 (51. 59)	59. 71 (50. 62)
G_3	82. 54 (65. 52)	80. 79 (64. 19)	78. 83 (62.	76. 75 (61.	74. 54 (59.

			73)	26)	76)
G 4	84. 79 (67. 44)	82. 45 (65. 59)	80. 79 (64. 26)	78. 96 (62. 89)	76. 21 (60. 98)
G 5	82. 36 (64. 45)	80. 33 (63. 86)	78. 86 (62. 77)	77. 17 (61. 61)	74. 38 (59. 67)
CD at 5%	1. 57	1. 42	1. 30	1. 45	0. 96

Table 3: Effect of different treatments on per cent normal seedlings at different storage period in rice

Treatments	Storage Period				
	January	February	March	April	May
T 1	81. 73 (65. 39)	79. 40 (63. 61)	77. 80 (62. 43)	74. 47 (60. 15)	72. 40 (58. 70)

	81. 27	79. 07	76. 67	75. 00	72. 33
T 2	(64. 86)	(63. 26)	(61. 43)	(60. 36)	(58. 48)
	77. 93	75. 33	74. 20	72. 27	70. 07
T 3	(62. 37)	(60. 71)	(59. 79)	(58. 46)	(57. 02)
	80. 73	73. 80	72. 53	71. 07	68. 93
T 4	(62. 90)	(59. 62)	(58. 72)	(57. 73)	(56. 35)
	75. 87	74. 00	72. 53	71. 13	69. 00
T 5	(61. 16)	(59. 68)	(58. 64)	(57. 70)	(56. 29)
	77. 13	74. 93	73. 07	71. 12	69. 47
T 6	(61. 77)	(60. 23)	(58. 96)	(57. 69)	(56. 58)
T 7	76. 67	74. 73	72.	70.	68.

			67	67	13
	(61. 50)	(60. 18)	(58. 78)	(57. 45)	(55. 79)
T_8	71. 93 (58. 20)	70. 27 (57. 09)	68. 40 (55. 95)	60. 07 (54. 48)	63. 80 (53. 10)
CD at 5%	1. 98	1. 80	1. 64	1. 45	1. 22

Table 4: Cumulative effect of containers, genotypes and fungicidal treatment on per cent normal seedling at different storage periods in rice

C x G x T	Storage Period				
	Januar y	Februa ry	March	April	May
$C_1 G_1 T_1$	77. 33 (58. 96)	69. 33 (56. 38)	67. 67 (54. 95)	64. 67 (53. 54)	63. 33 (52. 74)
$C_1 G$	74. 67	64. 33	68. 00	66. 67	64. 67

$_1T_2$	(59. 81)	(56. 42)	(55. 59)	(54. 74)	(53. 56)
C $_1$G	69. 33	66. 00	64. 00	61. 63	60. 00
$_1T_3$	(56. 38)	(54. 35)	(53. 13)	(51. 56)	(50. 77)
C $_1$G	69. 00	68. 73	68. 00	65. 62	60. 67
$_1T_4$	(56. 43)	(55. 74)	(55. 15)	(53. 64)	(57. 16)
C $_1$G	69. 33	66. 67	67. 90	64. 67	62. 67
$_1T_5$	(56. 53)	(54. 91)	(55. 20)	(53. 56)	(52. 36)
C $_1$G	70. 00	66. 67	65. 33	63. 33	62. 00
$_1T_6$	(56. 84)	(54. 75)	(53. 95)	(52. 74)	(51. 95)
C $_1$G	68. 00	63. 33	63. 33	52. 05	61. 33
$_2T_7$	(54. 58)	(54. 35)			

			(52. 74)	(51. 95)	(51. 56)
$C_1G_1T_8$	65. 33	64. 67	64. 00	62. 00	60. 67
	(53. 93)	(53. 54)	(53. 16)	(51. 97)	(51. 58)
$C_1G_2T_1$	75. 67	64. 33	70. 00	60. 00	59. 33
	(57. 24)	(56. 45)	(56. 80)	(50. 81)	(50. 39)
$C_1G_2T_2$	71. 33	70. 00	68. 67	66. 67	64. 00
	(56. 63)	(56. 80)	(55. 96)	(54. 74)	(53. 14)
$C_1G_2T_3$	67. 33	64. 67	62. 67	61. 33	60. 67
	(55. 15)	(53. 54)	(52. 35)	(51. 56	(51. 16)
$C_1G_2T_4$	65. 33	63. 33	62. 67	62. 00	60. 00
	(53. 95)	(52. 78)			

			(52. 36)	(51. 96)	(50. 78)
$C_1G_2T_5$	68. 67 (56. 04)	67. 33 (55. 16)	66. 67 (54. 74)	64. 00 (53. 14)	62. 67 (52. 34)
$C_1G_2T_6$	70. 00 (56. 82)	66. 00 (54. 41)	62. 67 (52. 36)	61. 33 (51. 57)	61. 33 (51. 57)
$C_1G_2T_7$	66. 33 (54. 94)	64. 67 (53. 14)	62. 67 (49. 99)	60. 63 (51. 17)	58. 67 (49. 99)
$C_1G_2T_8$	65. 33 (53. 35)	64. 00 (53. 36)	58. 67 (51. 95)	57. 33 (49. 23)	53. 33 (48. 06)
$C_1G_2T_1$	86. 67 (69. 19)	86. 51 (69. 00)	80. 67	80. 00	78. 00

			(66. 42)	(63. 96)	(62. 17)
$C_1G_3T_2$	86. 67 (68. 17)	87. 33 (69. 24)	82. 67 (67. 55)	79. 93 (63. 80)	76. 67 (61. 65)
$C_1G_3T_3$	84. 67 (66. 02)	81. 33 (64. 45)	79. 33 (63. 57)	78. 00 (62. 09)	76. 00 (60. 78)
$C_1G_3T_4$	82. 07 (65. 45)	82. 00 (64. 98)	79. 33 (62. 97)	78. 66 (62. 50)	75. 33 (60. 24)
$C_1G_3T_5$	84. 67 (67. 50)	82. 00 (64. 96)	80. 00 (63. 94)	78. 66 (62. 51)	74. 67 (59. 78)
$C_1G_3T_6$	82. 67 (65. 40)	82. 00 (64. 90)	80. 20	77. 33	74. 67

			(63. 84)	(61. 59)	(59. 78)
$C_1G_3T_7$	81. 33 (64. 50)	79. 33 (62. 99)	76. 67 (61. 12)	75. 33 (60. 24)	72. 00 (58. 06)
$C_1G_3T_8$	75. 33 (60. 25)	74. 67 (59. 81)	72. 67 (58. 12)	89. 33 (56. 38)	68. 00 (55. 58)
$C_1G_4T_1$	92. 67 (74. 40)	90. 00 (71. 62)	89. 33 (71. 05)	82. 67 (68. 23)	85. 33 (67. 55)
$C_1G_4T_2$	88. 00 (70. 49)	86. 67 (69. 35)	84. 00 (66. 75)	82. 67 (65. 55)	80. 67 (64. 17)
$C_1G_4T_3$	85. 33 (67. 49)	82. 00 (65. 02)	79. 00	78. 83	77. 50

			(63. 95)	(62. 71)	(61. 63)
$C_1G_4T_4$	85. 33 (67. 49)	84. 00 (66. 50)	82. 00 (65. 04)	80. 00 (63. 45)	76. 67 (61. 15)
$C_1G_4T_5$	83. 33 (65. 94)	82. 00 (64. 92)	78. 67 (62. 51)	77. 33 (61. 59)	75. 33 (60. 25)
$C_1G_4T_6$	82. 67 (65. 71)	80. 67 (64. 04)	80. 67 (64. 04)	80. 00 (63. 51)	77. 33 (61. 59)
$C_1G_4T_7$	84. 00 (66. 67)	82. 00 (65. 04)	80. 67 (64. 09)	78. 67 (62. 71)	75. 33 (60. 33)
$C_1G_4T_8$	78. 67 (62. 70)	74. 00 (59. 44)	73. 33	71. 33	66. 67

			(59. 04)	(57. 74)	(54. 78)
$C_1G_5T_1$	84. 67 (67. 42)	83. 00 (65. 34)	82. 67 (60. 57)	80. 00 (63. 55)	77. 33 (61. 64)
$C_1G_5T_2$	83. 33 (66. 88)	82. 00 (65. 46)	79. 33 (63. 24)	79. 00 (63. 10)	75. 33 (60. 30)
$C_1G_5T_3$	82. 67 (65. 55)	80. 67 (64. 04)	80. 00 (63. 57)	78. 00 (62. 08)	76. 67 (61. 15)
$C_1G_5T_4$	64. 00 (66. 63)	82. 67 (65. 45)	81. 33 (64. 41)	80. 00 (63. 43)	78. 00 (62. 04)
$C_1G_5T_5$	81. 33 (65. 52)	77. 33 (61. 88)	76. 00	75. 33	72. 67

			(60. 81)	(60. 40)	(58. 57)
$C_1G_5T_6$	82. 67 (65. 40)	80. 00 (63. 43)	77. 33 (61. 59)	74. 67 (59. 78)	73. 33 (58. 91)
$C_1G_5T_7$	83. 32 (65. 96)	82. 00 (65. 04)	80. 00 (63. 60)	76. 67 (61. 27)	75. 33 (60. 34)
$C_1G_5T_8$	67. 00 (60. 68)	72. 67 (58. 48)	73. 33 (58. 97)	71. 33 (57. 67)	69. 33 (56. 39)
$C_2G_1T_1$	76. 00 (60. 78)	72. 67 (58. 49)	71. 33 (57. 71)	68. 67 (55. 96)	66. 67 (54. 74)
$C_2G_1T_2$	72. 00 (58. 09)	74. 00 (59. 39)	70. 00	64. 67	64. 00

			(56. 82)	(53. 56)	(54. 74)
$C_2G_1T_3$	60. 67 (51. 19)	68. 00 (55. 57)	67. 33 (55. 17)	66. 00 (54. 33)	62. 00 (51. 95)
$C_2G_1T_4$	60. 67 (51. 39)	58. 00 (49. 62)	58. 00 (49. 63)	56. 00 (48. 46)	53. 33 (46. 92)
$C_2G_1T_5$	60. 67 (51. 39)	58. 67 (50. 02)	58. 67 (50. 01)	59. 33 (50. 38)	60. 00 (50. 77)
$C_2G_1T_6$	79. 33 (56. 45)	67. 33 (55. 17)	64. 00 (53. 15)	62. 67 (52. 34)	61. 33 (51. 56)
$C_2G_1T_7$	68. 00 (55. 61)	65. 33 (53. 98)	66. 00	64. 67	62. 00

			(54. 39)	(53. 57)	(51. 95)
$C_2G_1T_8$	62. 00 (51. 95)	60. 67 (57. 17)	62. 67 (52. 39)	61. 33 (51. 59)	59. 33 (50. 41)
$C_2G_2T_1$	70. 67 (57. 26)	68. 67 (55. 97)	66. 67 (54. 94)	58. 67 (50. 00)	55. 33 (48. 07)
$C_2G_2T_2$	70. 33 (60. 25)	70. 67 (57. 30)	68. 67 (56. 04)	66. 67 (54. 80)	64. 67 (53. 56)
$C_2G_2T_3$	70. 67 (57. 22)	68. 67 (56. 10)	66. 67 (54. 81)	64. 00 (53. 15)	61. 33 (51. 55)
$C_2G_2T_4$	64. 00 (53. 17)	62. 67 (55. 36)	61. 33	60. 00	58. 67

			(51. 57)	(50. 78)	(49. 99)
$C_2G_2T_5$	64. 00 (53. 24)	66. 67 (54. 91)	63. 33 (52. 78)	62. 67 (52. 36)	61. 33 (52. 57)
$C_2G_2T_6$	66. 67 (54. 76)	65. 33 (53. 98)	65. 33 (53. 94)	64. 00 (53. 13)	62. 67 (52. 34)
$C_2G_2T_7$	67. 33 (55. 16)	64. 67 (53. 55)	60. 00 (50. 82)	57. 33 (49. 26)	56. 67 (48. 86)
$C_2G_2T_8$	63. 33 (52. 74)	66. 67 (54. 75)	57. 33 (49. 24)	54. 67 (47. 71)	52. 67 (46. 54)
$C_2G_3T_1$	86. 00 (68. 17)	84. 00 (66. 71)	82. 67	80. 67	78. 67

			(60. 57)	(63. 99)	(62. 51)
$C_2G_3T_2$	84. 00 (66. 60)	81. 33 (64. 50)	80. 67 (63. 99)	79. 33 (63. 05)	77. 33 (61. 64)
$C_2G_3T_3$	82. 67 (65. 45)	82. 00 (64. 97)	80. 00 (63. 51)	77. 33 (61. 66)	76. 00 (60. 72)
$C_2G_3T_4$	81. 33 (64. 45)	79. 33 (62. 97)	76. 67 (61. 12)	75. 33 (60. 24)	74. 67 (59. 73)
$C_2G_3T_5$	83. 33 (66. 22)	80. 67 (64. 04)	80. 00 (63. 51)	75. 33 (61. 60)	75. 33 (60. 25)
$C_2G_3T_6$	82. 67	80. 00 (63. 51)	78. 00	74. 67	74. 00

	(65. 49)		(60. 04)	(59. 78)	(59. 38)
$C_2G_3T_7$	81. 33 (64. 43)	78. 67 (62. 51)	78. 00 (60. 04)	76. 00 (60. 67)	71. 33 (57. 63)
$C_2G_3T_8$	74. 67 (59. 83)	74. 00 (59. 48)	73. 33 (58. 96)	70. 67 (57. 22)	70. 00 (56. 80)
$C_2G_4T_1$	91. 33 (73. 04)	90. 00 (71. 80)	88. 33 (66. 40)	86. 67 (68. 33)	84. 00 (66. 53)
$C_2G_4T_2$	87. 33 (69. 34)	85. 33 (67. 63)	84. 00 (65. 00)	80. 67 (63. 92)	76. 67 (61. 12)
$C_2G_4T_3$	82. 00 (65. 42)	79. 33 (63. 42)	79. 33	78. 00	74. 67

			(63. 24)	(62. 13)	(59. 83)
$C_2G_4T_4$	85. 33 (67. 55)	82. 00 (64. 92)	80. 00 (63. 51)	78. 67 (62. 57)	75. 33 (60. 28)
$C_2G_4T_5$	80. 67 (63. 96)	78. 00 (62. 04)	77. 33 (61. 57)	76. 00 (60. 75)	73. 33 (58. 96)
$C_2G_4T_6$	82. 67 (65. 88)	80. 00 (63. 69)	78. 00 (62. 14)	75. 33 (60. 42)	74. 67 (59. 83)
$C_2G_4T_7$	84. 67 (67. 32)	84. 00 (66. 71)	81. 33 (64. 50)	78. 00 (62. 07)	73. 33 (58. 96)
$C_2G_4T_8$	80. 63 (63. 96)	76. 67 (61. 29)	74. 67	72. 00	70. 67

			(59. 88)	(58. 08)	(52. 32)
$C_2G_5T_1$	86. 33 (67. 55)	84. 67 (64. 40)	83. 87 (66. 92)	82. 67 (64. 50)	76. 00 (60. 68)
$C_2G_5T_2$	86. 00 (68. 14)	84. 00 (66. 51)	83. 67 (66. 40)	82. 00 (64. 90)	79. 33 (62. 97)
$C_2G_5T_3$	80. 67 (64. 17)	80. 00 (63. 66)	78. 67 (62. 64)	77. 33 (61. 64)	74. 00 (59. 37)
$C_2G_5T_4$	82. 67 (65. 47)	80. 67 (63. 92)	80. 00 (63. 45)	77. 33 (61. 57)	76. 67 (61. 12)
$C_2G_5T_5$	82. 67 (65. 55)	80. 67 (63. 96)	78. 00	76. 00	72. 00

			(62. 04)	(60. 68)	(58. 06)
$C_2G_5T_6$	82. 00 (64. 92)	81. 33 (64. 41)	79. 33 (62. 27)	78. 00 (62. 04)	73. 33 (58. 93)
$C_2G_5T_7$	82. 67 (65. 40)	81. 33 (64. 41)	78. 67 (63. 06)	77. 33 (61. 61)	75. 33 (60. 25)
$C_2G_5T_8$	76. 00 (60. 04)	74. 00 (54. 35)	74. 00 (59. 16)	70. 67 (57. 25)	65. 33 (53. 94)
CD at 5%	6. 27	5. 68	5. 19	4. 59	3. 85

Each value in table is mean of three replications

Values in parenthesis are angular transformed value

C_1 = Polythene bags

C_2 = Cotton bags

G_1 = CMS 58025 A

G_2 = CMS 58025 B

G_3 = Restorer (IR-66)

G_4 = Restorer (KMR-3)

G_5 = Variety (Pant Dhan-11)

T_1 = Thiram

T_2 = Thiram + Bavastin

T_3 = Bavistin

T_4 = Captan

T_5 = Vitavax

T_6 = Chlorothalonil

T_7 = Contaf

T_8 = Check

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