

A COMPARATIVE STUDY OF YIELD COMPONENTS ANALYSIS IN WHEAT AND TRITICALE CROSSES

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B. Sc. (Agric.) Ain Shams University 1976

M. Sc. (Agric.) Ain Shams University 1982

DISSERTATION

Submitted in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

IN

AGRONOMY

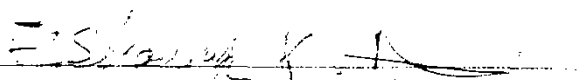
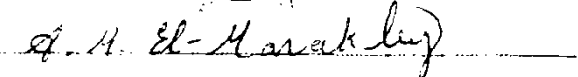
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1987

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Date / / 1987

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ACKNOWLEDGEMENT

The author wishes to express his deep gratitude and sincere appreciation to late Prof. Dr. M.I. El-Ghawas, Professor of Agronomy, Agronomy Department, Faculty of Agriculture, Ain Shams University, who passed away on December, 1985 for suggesting the problem, his supervision, and great help during the course of this study.

Special thanks and deep appreciation are also due to Prof. Dr. K.A. El-Shouny, Professor of Agronomy and Dr. A.M. Esmail, Associate Professor of Agronomy, Agronomy Department, Faculty of Agriculture, Ain Shams University for their supervision, valuable criticism, fruitful advice, and guidance throughout the course of this study.



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REVIEW OF LITERATURE

The following is a review of the work done on the correlation between some agronomic characters and grain yield as well as path-coefficient analysis of yield components in each of wheat and triticale.

A- Correlation studies :

1- Plant height:

I. Wheat : The correlation between plant height and grain yield in wheat was extensively studied by many workers. Mc Neal (1960), El-Ghawas and El-Ballal (1961), Fonseca and Patterson (1968), Ketata et al. (1976), Virk et al. (1977) and Nanda et al. (1980) obtained positive and significant phenotypic correlation coefficients of 0.415, 0.1412, 0.319, 0.172, 0.45 and 0.426, respectively between plant height and grain yield from their studies on several genotypes and wheat crosses. Meantime, Loffler et al. (1985), Fonseca and Patterson (1968) found negative and significant phenotypic correlation coefficients of -0.35 and -0.295, respectively.

Positive and significant environmental correlation coefficients were estimated at 0.5356 and 0.205 between plant height and grain yield by El-Ghawas and El-Ballal (1961), while, positive and non-significant environmental correlation coefficients of 0.346 and 0.016 were reported by Sethi and Singh (1974) and Ketata et al. (1976), respectively.

Sethi and Singh (1974), Ketata et al. (1976) and Nanda et al. (1980) reported positive genotypic correlation coefficients of 0.438, 0.3904 and 0.581 & 0.840 between plant height and grain yield, respectively. Meantime, Gupta et al. (1979) found negative genotypic correlation coefficients of -0.08 and -0.21.

II- Tritical : Sapra and Hughes (1977), Sawant and Rawat (1979) and El-Ghawas et al. (1982) found positive and significant phenotypic correlation coefficients of 0.367, 0.467 and 0.282 between plant height and grain yield, respectively. On the other hand, Sethi and Singh (1972), Sandha et al. (1980) and El-Banna and El-Ashry (1986) found non-significant phenotypic correlation coefficients of 0.172, 0.17 and -0.30, respectively.

Sethi and Singh (1972) and El-Banna and El-Ashry (1986) reported non-significant environmental correlation coefficients of 0.101 and -0.14 between plant height and grain yield, respectively.

Positive genotypic correlation coefficients between plant height and grain yield were estimated at 0.215, 0.215, and 0.3019 by Sethi and Singh (1972), Shulyndin and Moksimov (1972) and El-Ghawas et al. (1982), respectively. While, negative genotypic correlation coefficient of -0.37 was reported by El-Banna and El-Ashry (1986).

2- Heading date :

I- Wheat: El-Ghawas and El-Ballal (1961), Fonseca and Patterson (1968), Ketata et al. (1976) and Nanda et al. (1980) reported negative and significant phenotypic correlation coefficients of -0.2186, -0.249 & -0.288, -0.1999 and -0.341, respectively between heading date and grain yield. Meantime, Fonseca and Patterson (1968) and Nanda et al. (1980) found negative and non-significant phenotypic correlation coefficients of -0.001 and -0.152, respectively.

Environmental correlation coefficients between heading date and grain yield were negative and significant and estimated at -0.281 and -0.2464 by Fonseca and Patterson (1968) and Ketata et al. (1976), respectively.

Genotypic correlation coefficients between heading date and grain yield were negative and estimated at -0.2333 and -0.865 by Ketata et al. (1976) and Nanda et al. (1980), respectively.

II- Triticale: El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986) reported negative and significant phenotypic correlation coefficients of -0.6086 and -0.87 between heading date and grain yield, respectively. Meantime, Sethi and Singh (1972), Sawant and Rawat (1979) and Sandha et al. (1980) found negative and non-significant phenotypic correlation coefficients

between heading date and grain yield, which estimated at -0.125, -0.037, -0.36, respectively.

Environmental correlation coefficients between heading date and grain yield were negative but not significant and calculated at -0.236 and -0.04 by Sethi and Singh (1972) and El-Banna and El-Ashry (1986), respectively.

Genotypic correlation coefficients between heading date and grain yield were negative and estimated at -0.079, -0.54, -0.6442 and -0.98 by Sethi and Singh (1972), Sandha et al. (1980), El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986), respectively.

3- Number of spikes per plant :

I- Wheat: Mc Neal (1960), El-Ghawas and El-Ballal (1961), Fonseca and Patterson (1968), Hsu and Walton (1971), Sethi and Singh (1974), Sidwell et al. (1976), Virk et al. (1977) and Nanda et al. (1980) found positive and significant phenotypic correlation coefficients of 0.598 & 0.797, 0.6113 & 0.7424, 0.708, 0.74, 0.755, 0.18, 0.74:0.88 and 0.74 between number of spikes and grain yield, respectively. In the meantime, Fonseca and Patterson (1968), Mehrotra and Mishra (1976) and Gupta et al. (1979~~2~~) reported positive and non-significant phenotypic correlation coefficient values of 0.141 and 0.300, 0.210 and 0.28 respectively.

Environmental correlation coefficients between number of spikes and grain yield were positive and significant and calculated at 0.577 & 0.883, 0.725, 0.73 and 0.3742 by El-Ghawas and El-Ballal (1961), Fonseca and Patterson (1968), Sethi and Singh (1974) and Ketata et al. (1976), respectively.

Positive genotypic correlation coefficients between number of spikes and grain yield were estimated at 0.685, 0.43 and 0.523 & 0.673 by Sethi and Singh (1974), Sidwell et al. (1976) and Nanda et al. (1980). In the meantime, Ketata et al. (1976) and Gupta et al. (1979a) reported negative genotypic correlation coefficients of -0.004 and -0.32 : -0.91, respectively.

II- Triticale : Phenotypic correlation coefficients between number of spikes and grain yield were positive and significant, and estimated at 0.589, 0.345, 0.65, 0.6417 and 0.73 by Sethi and Singh (1972), Sawant and Rawat (1979), Sandha et al. (1980), El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986), respectively.

Environmental correlation coefficients between number of spikes and grain yield were estimated at 0.284 and 0.08 by Sethi and Singh (1972) and El-Banna and El-Ashry (1986), respectively, which turned out to be not significant.

Positive genotypic correlation coefficients were 0.866, 0.56 and 0.84 in the studies of Sethi and Singh (1972), Sandha

et al. (1980) and El-Banna and El-Ashry (1986), respectively.

3- Peduncle length :

I- Wheat: Phenotypic, environmental and genotypic correlation coefficients between peduncle length and grain yield were positive and estimated at 0.379, 0.256 and 0.344 by Sethi and Singh (1974), respectively. Hsu and Walton (1971) found positive and non-significant phenotypic correlation coefficient between this character and grain yield.

II- Triticale: Sethi and Singh (1972) estimated values of phenotypic, environmental and genotypic correlation coefficients between peduncle length and grain yield. Its values were 0.225, -0.010 and 0.238, respectively.

5- Length of spike axis :

I- Wheat : El-Ghawas and El-Ballal (1961), Hsu and Walton (1971), Mehrotra and Mishra (1976) Gupta et al. (1979^a) and Nanda et al. (1980) found positive and significant phenotypic correlation coefficients between length of spike and grain yield, which ranged from 0.15 to 0.76. Meantime, Sethi and Singh (1974) and Gupta et al. (1979^a) reported positive and non-significant phenotypic correlation coefficients of 0.251 and 0.22, respectively.

El-Ghawas and El-Ballal (1961) reported positive and significant environmental correlation coefficient between spike

length and grain yield. While, Sethi and Singh (1974) found positive and non-significant environmental correlation coefficient of 0.251.

Positive genotypic correlation coefficients between spike length and grain yield of values 0.541, 0.13 and 0.40 was estimated by Sethi and Singh (1974), Gupta et al. (1979a) and Nanda et al. (1980), respectively. Meantime, Gupta et al. (1979) found negative genotypic correlation coefficient of -0.09.

II- Triticale : Phenotypic correlation coefficients between spike length and grain yield were positive and significant (0.0984 and 0.71), El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986), respectively.

Environmental correlation coefficient between spike length and grain yield was negative and non-significant (Sethi and Singh (1972)).

El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986) found positive genotypic correlation coefficients of 0.1386 and 0.80 between spike length and grain yield. Meantime, Sethi and Singh (1972) and Sandha et al. (1980) reported negative genotypic correlation coefficients of -0.254 and -0.18, respectively.

6- Number of spikelets per spike:

I- Wheat: Mc Neal (1960), El-Ghawas and El-Ballal (1961), Hsu and Walton (1971), Gupta et al. (1979a) and Nanda

et al. (1980) reported positive and significant phenotypic correlation coefficients of (0.946 & 0.931), 0.2786, 0.73, 0.16 and (0.292 : 0.507) between number of spikelets and grain yield, respectively. On the contrary, El-Ghawas and El-Ballal (1961) found negative and significant phenotypic correlation coefficients of -0.1297 between this character and grain yield. Meantime, Mehrotra and Mishra (1976) Ketata et al. (1976), Sidwell et al. (1976) and Gupta et al. (1979^a) reported positive and non-significant phenotypic correlation coefficients of 0.39, 0.0975, 0.08 and 0.15, respectively.

Environmental correlation coefficient between number of spikelets and grain yield was positive and significant. It was estimated as 0.05641 by El-Ghawas and El-Ballal (1961). While, Ketata et al. (1976) found positive and non-significant environmental correlation coefficient of 0.0942.

Genotypic correlation coefficients between number of spikelets and grain yield were positive and estimated at 0.1077, 0.17, 0.38, 0.306 by Ketata et al. (1976), Sidwell et al. (1976), Gupta et al. (1979) and Nanda et al. (1980), respectively. Meantime, Gupta et al. (1979^a) and Nanda et al. (1980) found negative genotypic correlation coefficients of -0.14 and -0.092, respectively.

II- Triticale : El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986) reported positive and significant phenotypic

correlation coefficients of 0.175 and 0.81 between number of spikelets and grain yield, respectively. While, Sandha et al. (1980) found positive and non-significant phenotypic correlation coefficient of 0.08.

Environmental correlation coefficient between number of spikelets and grain yield was estimated by El-Banna and El-Ashry (1986) and was found to be 0.32.

Some workers, El-Banna and El-Ashry (1986), found positive genotypic correlation coefficient of 0.92 between number of spikelets and grain yield, while another worker (Sandha et al. 1980) mentioned negative genotypic correlation coefficient of -0.31.

7- Spike density:

I- Wheat : El-Ghawas and El-Ballal (1961) studied the correlation between spike density and grain yield within twelve wheat varieties, which considered as intravarietal correlation (environmental correlation). The values of environmental correlation coefficients were ranged from -0.0995 (non-significant) to +0.3192 (significant at 0.05 level).

II- Triticale: No available literature about the correlation of spike density and grain yield in triticale.

8- Grain number per spike :

I- Wheat: Many investigators studied phenotypic correlation coefficients between grain number per spike and grain yield, Mc Neal (1960), El-Ghawas and El-Ballal (1961), Fonseca and Patterson (1968), Hsu and Walton (1971), Ketata et al. (1976), Sidwell et al. (1976), Virk et al. (1977) and Nanda et al. (1980). They mentioned that the phenotypic correlation coefficients were positive and significant and ranged from 0.1293 to 0.79. Meantime, Sethi and Singh (1974) and Gupta et al. (1979a) found positive and non-significant phenotypic correlation coefficients of 0.244 and 0.34, respectively.

Environmental correlation coefficients between grain number per spike and grain yield were positive and significant, it estimated at 0.6218 and 0.112 by El-Ghawas and El-Ballal (1961) and Fonseca and Patterson (1968), respectively. While, Sethi and Singh (1974) and Ketata et al. (1976) found positive and non-significant environmental correlation coefficients of 0.356 and 0.0683, respectively.

Positive genotypic correlation coefficients between grain number per spike and grain yield of values 0.507, 0.1831, 0.43, (0.413 : 0.71) and (0.423 & 1.22) were estimated by Sethi and Singh (1974), Ketata et al. (1976), Sidwell et al. (1976), Gupta et al. (1979a) and Nanda et al. (1980).

II- Triticale : Gill et al. (1976), Sandha et al. (1980), El-Ghawas et al. (1982) and El-Banna and El-Ashry (1986) found positive and significant phenotypic correlation coefficients between grain number per spike and grain yield, which ranged from 0.134 to 0.91. Meantime, Sawant and Rawat (1979) found negative and non-significant phenotypic correlation coefficient of -0.122.

Environmental correlation coefficient between grain number and grain yield was positive and significant, it was estimated at 0.69 by El-Banna and El-Ashry (1986).

Genotypic correlation coefficients between grain number and grain yield per plant were also positive and larger than phenotypic correlation coefficients, which calculated at 0.43 and 0.96 by Sandha et al. (1980) and El-Banna and El-Ashry (1986), respectively.

9- Grain weight of spike :

I- Wheat : Phenotypic correlation coefficients between grain weight of spike and grain yield were estimated at (0.2997 : 0.4794), 0.71 and (0.35 : 0.51) by El-Ghawas and El-Ballal (1961), Hsu and Waltan (1971) and Gupta et al. (1979^a), respectively, which turned out to be highly significant.

El-Ghawas and El-Ballal (1961) and Ahmed (1985) found positive environmental correlation coefficients between spike