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EFFECT OF UREA AND UREA PHOSPHATE ON THE UTILIZATION OF MINERAL ELEMENTS IN BUFFALO HEIFERS

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A balance trial was conducted on nine buffalo heifers to determine the effect of urea and urea phosphate on the utilization of some macro and micro mineral elements. The rations contained no urea (A), 2% urea (B) and 5.4% urea phosphate (C). The average daily Ca and P intakes were */i.0* I, 20.80 and 16.90 and 44.42, 31.96 and 85.59 gm on rations A, Band C, respectively. Statistically rations A and B had no effect on Ca and P digestion and retention but ration A had a significant effect on Ca and P absorption and retention. Low Ca was absorbed and retained by the heifers on ration A. Highly significant variation in Mg and Na balance among rations were observed which might be due to urea and urea phosphate. Higher losses of K were observed on urea and urea phosphate rations. Urea and urea phosphate had a significant effect on Fe retention. Digestion of Cu and Mn was poor in control ration (A) as compared to rations Band C.

INTRODUCTION

In raising dairy animals attention is focused on feeding roughages and concentration to supply adequate amounts of protein and energy. Other nutrients like mineral elements are ignored and this imbalance leads to poor growth of the animals and in turn adversely affects the production potential of the animals. Efforts have been made to study the effects of urea and urea phosphate on the utilization of mineral elements in buffalo heifers.

MATERIALS AND METHODS

A balance trial on nine buffalo heifers was conducted at the Nutrition Research Centre, University of Agriculture, Faisalabad to determine the effect of urea and urea phosphate on the utilization of minerals. There were three heifers of uniform age, size and weight under each ration. Three rations A (no urea), B (2% urea) and C (5,4% urea phosphate) were formulated (Table I&2) and were fed to the animals ad-labium for 90 days. The samples of dung, urine and feed ingredients were analysed for minerals. Total intake and outgo of minerals were calculated to work out the balance. The data were subjected to statistical analysis using the analysis of variance (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Calcium: The average daily calcium intake and digestibility values were 24.01, 20.80 I and 16.908 gm and 70, 81.85 and 63.67% on rations A, Band C, respectively. The excretion of calcium in urine was higher than in faeces. On the average, retention percentage of calcium was 35.11, 31.33 and 5.53 on rations A, Band C, respectively. Urea and urea phosphate had significant effect on the availability of calcium (Table 3). Apparently average blood plasma calcium level was 19.63, 24.85 and 18.12 mg/lOOml in heifers fed on rations A, Band C, respectively. Low

Table 1: General and specific combining ability effects calculated from the array means for various plant traits of 5x5 diallel cross.

Genotypes	Peducnle length	Spike length	Spikelets per spike	Grain per spike	Grain Yield / Plant
LU-26	17.502	12.3	19.002	60.452	28.489
Pak.81	15.438	11.9	20.266	64.396	31.962
Pb. 85	15.434	12.0	20.468	62.532	29.128
S-131	17.468	13.1	20.568	63.286	30.324
S-1018	16.634	11.7	19.100	62.632	30.799
MEAN OVER REPLICATIONS AND RECIPROCALS					
LU-26 X Pak. 81	16.67	12.00	19.67	60.33	28.04
LU-26 X Pb. 85	16.00	12.17	19.00	59.33	25.47
LU-26 X S-131	19.17	13.17	19.67	62.27	30.01
LU-26 X S-1018	17.67	11.83	18.00	60.00	32.85
Pak. 81 X Pb. 85	14.67	12.00	20.33	64.83	33.33
Pak.81 XS-131	16.17	13.00	21.00	65.33	34.49
Pak. 81 X S-1O18	16.67	11.50	19.33	63.16	33.07
Pb.85XS-131	17.00	12.00	21.17	62.00	27.28
Pb. 85 X S-1018	16.83	11.50	21.17	66.17	31.09
S-131 X S-1018	17.67	12.50	19.67	64.50	29.46

Table 2: Component of variation (± SE) for various characters of Wheat *(Triticum aestivum* L.)

Para-meters	Peducnle length	Spike length	Spikelets per spike	Grain per spike	Grain Yield / Plant
D	5.74 ± 0.46**	1.19 ± 0.27*	2.81 ± 0.44**	7.27 ± 2.45	2.22 ± 1.42
F	1.96 ± 1.20	0.04 ± 0.07	0.81 ± 1.15	4.13 ± 3.59	-2.23 ± 3.67
HI	3.71 ± 1.25	0.06 ± 0.07	1.45 ± 1.20	5.97 ± 3.68	21.53 ± 3.83*
H2	3.40 ± 1.13	-0.04 ± 0.06	1.17 ± 1.08	3.20 ± 3.47	19.15 ± 3.47*
h2	1.10 ± 0.77	0.33 ± 0.04*	-0.08 ± 0.73	19.89 ± 2.85**	7.78 ± 2.34*
E	0.33 ± 0.19	0.12 ± 0.01 **	0.17 ± 0.18	5.92 ± 2.24	1.74 ± 0.58

Derived Values	Peducnle length	Spike length	Spikelets per spike	Grain per spike	Grain Yield/ Plant
(H/D)O.5	0.80	-0.23	0.72	0.91	3.11
$H_2/4H_1$	0.23	0.16	0.20	0.13	0.22
(4DHl)o.5 +F)/(4DHl)o5_F)	1.54	0.76	1.50	1.91	0.72
h_2/H_2	0.68	-8.30	-0.07	6.23	0.41

* = P<0.05, ** = P<O.01

Fig. 1.1 The regression of Wr on Vr for peduncle length.

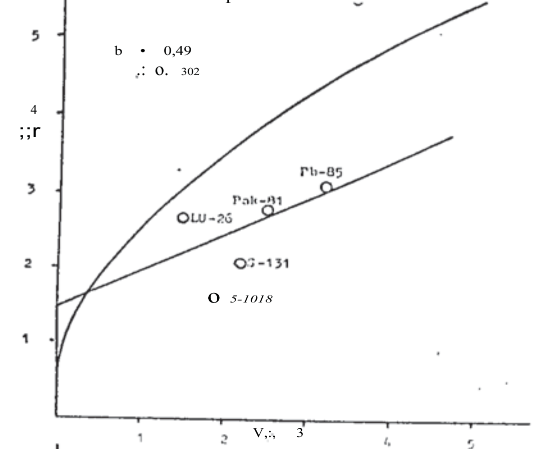


Fig. 1.2 The regression of Wr on Vr for spike length.

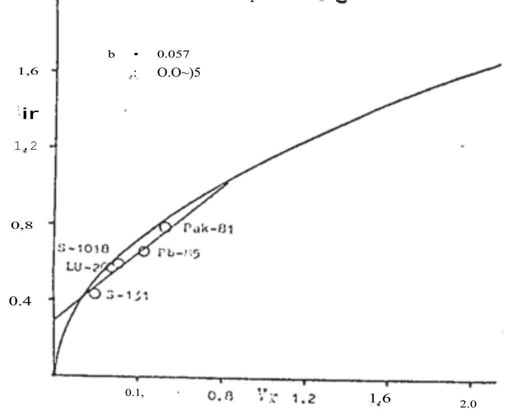


Fig. 1.3 The regression of Wr on Vr for spikelets per spike.

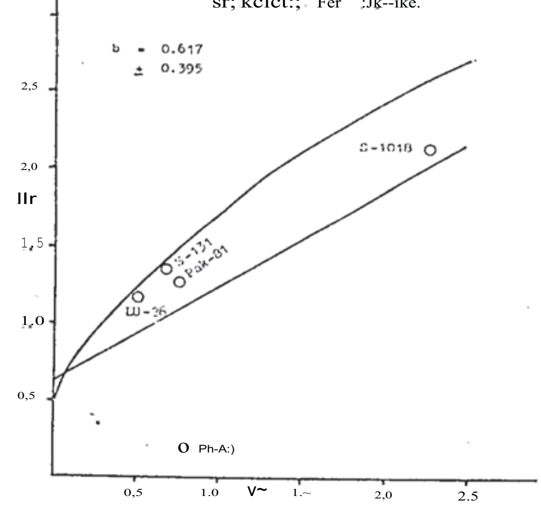


Fig. 1.4 The regression of Wr on Vr for number of grains per spike.

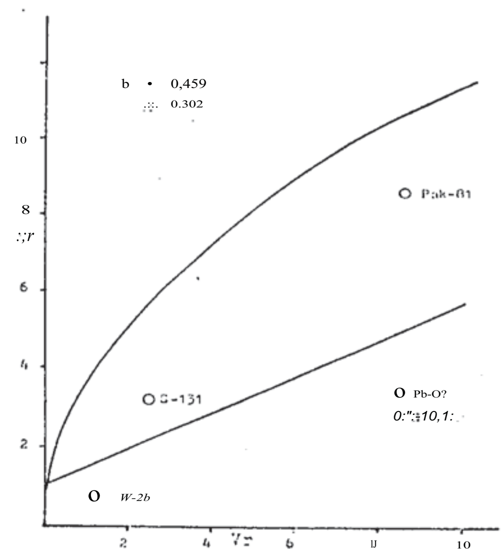
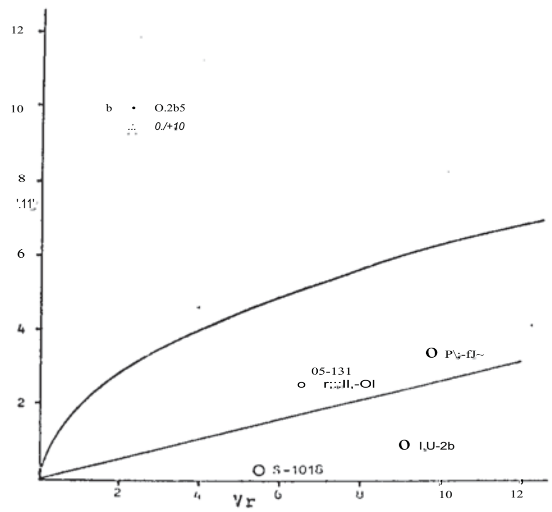


Fig. 1.5 The regression of Wr on Vr for grain yield per plant.



while Pb. 85 possessed relatively few dominant genes as it was away from origin.

Component Analysis:

The variance due to additive component (D) was higher than dominance component (HI and H_2) for all traits except grain yield per plant indicating pre ponderance of additive gene effects for yield components. the value for dominant component of variance (H 1 and H2) which implies proportion of dominance variance due to positive and negative gene effects was significant for grain yield per plant (Table 2).

The positive values of F (mean of variance of additive and dominance effects) for all traits except grain yield per plant indicated that there were more dominant than recessive alleles regardless of positive or negative direction. The mean degree of dominance (HI/D)o.s was partial for peduncle length, spike lets per spike and grains per spike while over-dominant for grain yield per plant. The degree of dominance revealed by graphic analysis is similar in all other traits except grain yield per plant. This situation may arise because the estimates of mean degree of dominance give an approximate value in real sense (Sharma and Ahmad, 1979).

The proportion of genes with positive and negative effects ($H_2/4H_1$) was less than 0.25 for all traits indicating that positive and negative allele frequencies were unequal in parental lines.

The proportion of dominant and recessive genes In the parents ($4DH_1$)o.S+F) / ((4DH\)o.s-F) was less than unity in spike length and grain yield per plant indicating excess of recessive alleles in the parents. These estimates were higher than unity for all other traits, suggesting high proportion of dominant alleles in the population.

In conclusion, diallel analysis hybridization programs can be outlined for improving agronomic traits. Crosses between parents viz; LU-26, Pak.81, Pb. 85 and S-131 have shown additive type of gene action for peduncle length, spikelets per spike and number of grains per spike, which suggested that careful selection of desirable traits in early segregating generations would provide fruitful results.

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