Research Article

Stability type analytical approach in long term fertilizer experiment

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Abstract In this paper, we conclude Stability type analytical approach in long term fertilizer experiment. no treatment is found to be suitable for making recommendations for general adoption as none of them could satisfy the criteria of having slope within limits of mean (b) ± SE(bi) with yields exceeding grand mean by its standard error.
Keywords: fertilizer experiment.

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INTRODUCTION

The contribution of agricultural scientists in terms of testing consistent performance over places/ seasons or both is called as stability of that particular variety, after having conducted various experiments to test validity of statements made about the consistent performance of varieties. The suitability of treatment, variety effects for places and climatic variations are taken into account so that the proper recommendations are made about the utility of treatment for various factors to draw valid and appropriate conclusions. The various considerations are to be taken up into account while planning experiments. The suitability or consistency of a treatment over season and places is defined as the interaction with the environment. (placket R.L.1960)The usual procedure of analysis may not be useful to draw valid conclusions and as such the usually analysis of variance table needs to be extended for considering interaction with the environment. Environmental Index is developed as difference between mean of a trial in an year and grand mean over all the treatments and the years. The presence of trends prevailing in the series of means of a treatment observed over a time period if any exists can be detected by fitting the data to appropriate trend curves. The curve yielding significant of determined R^2 indicates the presence of trends in the data the useful trends are (Stell, R.G.D and Torrie J.H 1980).

PRELIMERIES

The technique of stability analysis analysis is applied in breeding trials. However this technique is used to evaluate suitability of treatments from multi locations and single site experiments. This technique provides additional information on the nature of (Treatment x environment) interaction. The steps involved in application of this technique are. Environmental Index is developed as difference between mean of a trial in an year and grand mean over all the treatments and the years. The presence of trends prevailing in the series of means of a treatment observed over a time period if any exists can be detected by fitting the data to appropriate trend curves. The curve yielding significant of determined R^2 indicates the presence of trends in the data the useful trends are (Stell, R.G.D and Torrie J.H 1980).

1. $Y = a+bt$
2. $Y = a +bt +ct^2$
3. $Y= a+bt+ct^2+dt^3$
4. $Y =a(b)^t$

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Regression of means of each treatment on environmental indices be carried out and obtained the estimates of analysis of experiments with slope within limits of AM+S.E.

RESULTS

The data pertaining to wheat grain yields obtained during the period 1992-98 were subjected to the technique described above for assessing the nature of Treatment x Year interaction. In the present study, the data did not exhibit any secular trend. The results of linear and exponential regressions were presented in Table No 1. This table confirms the absence of any significant trends within treatment means observed during the period 1992-98.

Table 1: Estimated Trend equations Crop: Wheat

Sr. No.		LINEAR CURVE			EXPONETIAL CURVE		
	Treatment	a	b	R^2	a	b	R^2
1	Control	2.66	- 0.62	0.08	2.52	0.91	0.11
2	50% NPK	13.14	-1.11	0.37	13.38	0.88	0.33
3	75% NPK	17.45	-1.60	0.39	17.55	0.87	0.35
4	100% NPK	21.08	-1.44	0.16	19.8	0.91	0.15
5	150% NPK	24.9	- 1.03	0.06	23.46	0.95	0.06
6	100% NPK (S free)	20.12	- 1.47	0.18	19.18	0.89	0.17
7	100% NPK + 10 kg (S)	29.9	-2.92	0.34	29.89	0.85	0.32
8	100% NPK = 47.5 Kg (S)	19.41	- 1.01	0.07	17.38	0.93	0.05
9	100% NPK + 10 Kg $ZnSO_4$	21.7	- 1.72	0.26	21.61	0.88	0.24
10	100% NPK + 20 kg ZnS	19.55	-1.24	0.09	16.19	0.93	0.05
11	100% N	14.23	- 1.01	0.31	15.16	0.89	031
12	100% NP	20.21	- 1.84	0.37	19.85	0.87	0.34
13	100% NPK + 10 Tn. FYM	21.61	-0.35	0.01	20.21	0.97	0.01
14	FYM 10 Tn	10.1	- 0.77	0.99	7.08	0.89	0.04

The data was then further subjected to weighted regression Analysis and estimated stability parameters in the sense of Eberhart and Rusell (1965) and the results of the same are presented in Table No.2

Table 2: Results of Stability Analysis Crop: Wheat

Sr. No.	Treatment	Intercept	Slope	S.E.	R^2	Mean	S_{di}^2	F
1	1. Control	1.24	0.05	0.05	0.17	2.01	- 0.12	0.92
2	2. 50% NPK	8.95	0.7	0.04	0.98*	8.7	- 0.82	0.50
3	3. 75% NPK	12.05	1.01	0.06	0.98*	8.7	- 0.82	0.50
4	4. 100% NPK	16.99	1.39	0.68	0.98*	15.33	1.43	1.86
5	5. 150% NPK	20.98	1.34	0.04	0.99*	20.78	- 0.48	0.70
6	6. 100% NPK (S free)	15.24	1.27	0.05	0.99	14.25	-0.22	0.89
7	7 100% NPK + 10 Kg (S)	15.4	1.16	0.06	0.98*	18.23	0.73	1.49
8	8 100% NPK + 47.5 Kg (S)	16.12	1.32	0.03	0.99*	15.36	-1.13	0.31
9	9. 100% NPK + 10 Kg. $_4$ +	15.69	1.28	0.05	0.99*	14.83	0.26	1.16
10	10. 100% NPK + 20 Kg. $ZnSO_4$	16.18	1.33	0.05	0.99*	14.61	- 0.18	0.88
11	12 100% NP	14.48	1.19	0.08	0.97*	12.87	3.09	2.87
12	13 100% NPK + 10 Tn. FYM	20.28	1.27	0.08	0.97*	20.19	- 0.71	0.56
13	14 FYM 10 Tn	2.67	0.08	0.20	0.03	6.97	25.35	16.3

The above table provides very useful information to the experiments for drawing inferences and making recommendations for general adoption. Treatments Control (T_1) and FYM (T_{14}) are found to have non significant regression coefficients which indicates the presence of absolute stability in the sense of biological concept. Any improvement in the environments may not result into increase in the response of the treatments. Application of 50% NPK (T_2) has significant regression coefficient below one with $S_{di}2 = 0$ as such this treatment cannot be considered for recommendation under poor environments as its yield is being lower than average level. On the other hand the application of 100% N (T_{11}) alone whose regression coefficient is below one cannot be identified as a stable one as its $S_{di}2$ differs significantly from zero besides low yield potential.

CONCLUSION

On the examination of complete results of stability analysis no treatment is found to be suitable for making recommendations for general adoption as none of them could satisfy the criteria of having slope within limits of mean (b) $\pm$ SE(bi) with yields exceeding grand mean by its standard error. It is interesting to note that, with the available information and the analysis carried, no treatment is found to be suitable for making general recommendations as none of them could satisfy the criteria defined for general adoption which indirectly hints the necessity of continuing the experiment.

REFERENCES

1. Graybill, F.A((1961)
2. An introduction to Linear Statistical model. Vol.11,McGraw Hill, New Yark
3. Plackett, R.L.(1960)
4. Principles of Regression Analysis, Oxford University Press, London.
5. Steel, R.G.D.and Torrie, J.H. (1980)
6. Principles and procedures of statistics 2nd Ed.McGraw Hill, New York

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