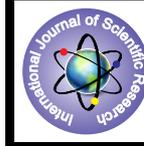


Repeated Randomised Block Design



Mathematics

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ABSTRACT

Introduction of straight varieties and Hybrids along with package of practices needs to be tested for consistent performance over environment. All crops and package of practices have to pass through these environments. The consistent performing varieties are preferred by farmers rather than the high yielders. The field experiment need to be repeated over season / places, and both seasons and places. The experiments are designed and conducted preferably to arrive at valid conclusions The experiment may be planned in such a way that suitable design is adopted with no change in the level of treatment as well as to field position. Sometimes it is desirable to have more than a single randomized block design with some treatments but the different experimental material. If the set of treatment is small in number then to have sufficient error Randomized Block Design needs to be repeated at or different locations The analytical procedure of single factor experiment conducted in R.B.D. repeated over season / places provides sufficient degree of freedom to the experimental error and makes comparison possible

Introduction:-

Agriculture is solely dependent on erratic behavior of nature and hence the agricultural stability has been a matter of concern in the statistics of agricultural development. Introduction of straight varieties and Hybrids along with package of practices needs to be tested for consistent performance over environment. The environment may be defined as the performance of various weather parameters, rainfall, maximum and minimum temperature, wind velocity, sun shine hours, humidity which varies from place to place and time to time. All crops and package of practices have to pass through these environments. The consistent performing varieties are preferred by farmers rather than the high yielders. The field experiment need to be repeated over season / places, and both seasons and places. The experiments are designed and conducted preferably to arrive at valid conclusions.

Preliminaries:-

The experiment may be planned in such a way that suitable design is adopted with no change in the level of treatment as well as to field position. Sometimes it is desirable to have more than a single randomized block design with some treatments but the different experimental material. If the set of treatment is small in number then to have sufficient error Randomized Block Design needs to be repeated at or different locations.

Results and Discussion

Analysis of variance for randomized block design

The analysis of variance for randomized Block gives the following ANOVA Analysis of variance table for Randomized Block Design repeated at or different places is presented in table 1. (Bhuyan K.C. 1989).

Table1. Analysis of variance for repeated randomized block design

Source of variance	d.f.	Sum of squares	Mean of sum of square
Places	(P-1)	-	
Replication within places	P (r-1)	-]	
Treatment	(t-1)	-	
Interaction (t x p)	(p-1) (t-1)	-	
Error	(P-1) (t-1)	By subtraction	
Total	(prt - 1)		

Analysis of repeated randomized block design (Set I):

The experiment was conducted in randomized block design at two places i.e. Set I and Set II. The results obtain are presented set wise and combined i.e. Pooled. To study the performance of treatments over the places and their interactions the analysis of individual experiment will not help in comparison of treatment over treatment. Hence, the analysis was carried out using the principle as explained in table no 1.

Table 2. Analysis of repeated randomized block design (Set I)

Treatment	RI	RII	RIII	Total	Mean
Ti	66	68	68	202	67.33
T2	68	65	67	200	66.67
T3	64	65	68	197	66.67
T4	61	64	64	189	63.00
T5	67	70	63	200	68.67
T6	60	64	68	192	64.00
T7	72	69	67	202	67.33
T8	72	63	67	202	67.33
T9	72	66	65	203	67.67
T10	70	62	66	198	66.00
Total	672	656	663	1991	

Table 3. Analysis of repeated randomized block design ANOVA (Set I)

Source	DF	SS	MSS
Replication	(r-1) = 2	0.466667	0.233333
Treatment	(T - 1) = 9	43.63333	4.848148
Error	18	130.8667	7.27,037
Total	29	174.9667	

Table 4. Analysis of repeated randomized block design (Set II)

Treatments	RI	RII	RIII	Total	Mean
Ti	70.00	72.00	70.00	212.00	70.67
T2	72.00	71.00	70.00	213	71.00
T3	69.00	70.00	72.00	211	70.33
T4	65.00	70.00	69.00	204	68.00
T5	70.00	74.00	68.00	212	70.67
T6	64.00	70.00	72.00	206	68.67
T7	74.00	72.00	70.00	216	72.00
T8	76.00	69.00	71.00	216	72.00
T9	73.00	68.00	70.00	211	70.33
T10	72.00	68.00	70.00	210	70.00
TOTAL	705	704	702	2111	

Table5. Analysis of repeated randomized block design ANOVA (Set II)

Source	DF	SS	MSS
Replication	(r-1) = 2	12.87	6.434
Treatment	(T - 1) = 9	90.30	10.034
Error	18	179.80	9.989
Total	29	282.9667	

Table 6. ANOVA for pooled analysis for two sowing dates.

Source	DF	SS	MSS
Sets	$(S-1)=1$	171.92	171.92
Bet. Replication	$S(r-1) = 4$	13.34	3.34
Treatments	$(T-1) = 9$	133.94	14.89
Tnt (Tr x set)	$(T-1)(S-1) = 9$	305.8500	33.99
Pooled Error	$S(T-1)(r-1) = 36$	310.67	8.63

Homogeneity of error variances arising from both the locations is tested and the two sets of data are combined to arrive at conclusions. These types of analysis help in making comparisons possible over the locations.

Treatment comparisons over the locations are possible. The advantage of analysis of these types of experiments are:

- 1) The experimental material used at locations may be of different types or subjected to variations.
- 2) Arranging varieties / field planting / field mechanized set up in single Randomized Block is not possible i.e. in brief the experimental environment at different locations is not exactly identical.

Conclusion :-

The analytical procedure of single factor experiment conducted in R.B.D. repeated over season / places provides sufficient degree of freedom to the experimental error and makes comparison possible.

REFERENCE

Bhuyan K.C. (1989) A group of Randomized Block Design with A Heterocedic models