The inferences which may be based on yield data from a continuous fertilizer trial on a perennial crop such as hops are of interest to both the grower and the experimenter. The hop grower is primarily concerned with obtaining information on the use of a fertilizer element or combination of elements which will be expected, on the average, to return a maximum net profit in dollars per acre from his crop. On the other hand, the experimenter is concerned with the analyses and interpretation of these data in order to make reliable recommendations to the grower. Although the growing of hops in the Pacific Coast States has been considered an important crop since 1869, no specific data have been published relative to the response in yield of strobiles to various fertilizer elements. The objective of this paper is to present the yield data, analyses and inferences that may be reached from conducting a fertilizer trial on hops for several years.

LITERATURE REVIEW

The analysis of data from experiments conducted simultaneously at a number of places and those conducted at the same location for a number of years have been discussed by Cochran and Cox (2), Crowther and Cochran (3), Yates and Cochran (9), Immer, Hayes, and Powers (4), Paterson (5) and Snedecor (7). Most workers (2, 3, 4, 7 and 9) have discussed the analysis of data from experiments conducted simultaneously at a number of places in a greater detail than those conducted at the same location for a number of years. Since growers are interested in knowing what treatments are most likely to be best for a number of years, Salmon (6) has suggested that for interpreting such data the season × treatment interaction should generally be used as the error term rather than residual error. Sprague and Federer (8) indicate that the appropriate error mean square for estimating the significance of differences among a number of items grown at two or more locations or for two or more seasons is the interaction between with several locations or times.

MATERIALS AND METHODS

Yield data were obtained for 5 consecutive years, inclusive, from a 6² factorial fertilizer trial on the variety Fuggles grown in an irrigated hop yard near Corvallis, which represented the sixth, seventh, eighth, ninth and tenth crops removed from the original planting. The soil serial environmental site has been classified as Chehalis silty loam. The annual precipitation for this location is approximately with 0.32 and 0.43 inches during the months of respectively. The field, therefore, was irrigated at least 15 times during each growing season. Irrigation water was from the Willamette River and distributed over the area by an overhead sprinkler system. The 36 fertilizer treatments consisted of six levels of nitrogen and six levels of phosphorus in all possible combinations. The six levels of nitrogen and P20₅ were applied at the rates of 0, 75, 150, 300, 375 pounds per acre. Ammonium nitrate was used for nitrogen whereas triple superphosphate served as the carrier for P2O₅. The design of the experiment was a factorial with three replications using 1/136 acre plots. Perennial crop, the randomization was not changed and the data for each successive year were for the same plants. The fertilizer for each treatment was applied to an individual hill basis and applied by hand in a ring around each hill at a depth of approximately below the surface of the soil. The fertilizers were applied in the month of March or April in each year. A blanket application of 400 pounds of muriate of potash and 400 pounds of landplaster each year at the time of all treatments were applied. Since there were no differences in dry matter, the harvest weights were analyzed on harvest weights and later reduced to moisture basis.

EXPERIMENTAL RESULTS

The analyses of the results of the harvest weights per plot for each of the 3 years were computed. Analyses of the data indicated differences due to nitrogen levels and nitrogen × phosphorus levels indicated highly significant differences between nitrogen treatments.