

Statistics and Crop Research: An Introduction

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EDITORIAL

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Statistical approaches are useful to researchers at all stages of their research, from planning through publishing. However, we must remember that statistics will be useless if the study is badly designed. Inappropriate application of statistical methods, on the other hand, leads to inaccurate findings. The quality of the investigation's findings and conclusions is highly dependent on how well the experiment design and statistical analysis of the results match up. At research centers where scientists and expert statisticians collaborate, better quality investigation planning, conducting, and reporting is frequently achieved. However, in the majority of cases, researchers employ statistical approaches based on their knowledge and insight. According to surveys of biological and agricultural publications published at the turn of the century, up to 70% of study papers used or interpreted statistics inaccurately. We should anticipate that the situation has improved in recent years. I evaluated my comments on research articles for various agricultural publications from 2013 to 2017 and discovered that 55% of the manuscripts might be improved based on how statistical analysis results were used and interpreted. Kramer et al. also exhibit similar findings (2016). They looked at articles from the Journal of the American Society for Horticultural Science (JASHS) in a few volumes. Almost half of the studies evaluated exhibited issues with the application of experimental statistics. Mistakes in experiment design and statistical method application can also be found in papers from other fields of study. According to the findings of a survey of papers published in the United Kingdom and the United States that report animal research data, only 59% of the studies stated the hypotheses or objectives, 87% did not use randomization, and only 70% of the publications had information on measures of error or variability.

Typically, certain errors emerge during the planning stage of an investigation. Statistical methods are frequently used in ways that do not match the experimental design. In other situations, authors place too much emphasis on the use of statistical methodologies, neglecting to explain the biological significance of the research findings. Frequently, there is insufficient information supplied on how the statistical analyses were carried out. The purpose of this study is to highlight the most important aspects of commonly used statistical methods in plant and crop research, as well as to give recommendations for their effective application at all stages of the investigation.

In-plant and crop research, proper application of experimental statistics is critical. The results of surveys of research papers published in agricultural and biological journals demonstrate that writers frequently misuse or misinterpret statistics. In most cases, researchers do not pay enough attention to the proper application of statistics. Throughout the investigation, The purpose of this study is to highlight the most important aspects of commonly used statistical approaches in the study of plants and crops. The study covers the research design and statistical analysis, as well as basic assumptions and transformations, ANOVA application, regression and correlation analyses, and research findings presentation. There are suggestions about how to use statistical approaches properly at all levels of crop research. This document does not discuss statistical methods other than ANOVA and regression, which require more advanced computer packages to implement.