UNIVERSITI TEKNOLOGI MARA

A REVIEW IN MICRONUTRIENTS IN CULTIVATION OF PLANT

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ABSTRACT

Micronutrients zinc, iron, manganese, boron, chlorine, copper, and molybdenum are very important for optimum growth and yield of plant. This review will be discussing the function of each micronutrient, the effect of deficiency and toxicity of each of the micronutrient on plants, the optimum concentration of micronutrients required by plants, the method of application of micronutrients, micronutrients economics and recommended application rates and the characteristics of soil that affects the availability and uptake of micronutrients by plants. The objectives of this review are to identify micronutrients required by plants and to evaluate the performance of micronutrients required by plants.

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TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

1.1 RESEARCH BACKGROUND

According to the American Heritage® Science Dictionary (2016), the term 'plant' can be defined as an extensive collection of multicellular eukaryotic organisms belonging to the Kingdom Plantae inclusive of the vascular plants as well as bryophytes. A plant can be characterized by having cell walls made of cellulose and having chlorophyll which enable them to make their own food through photosynthesis except for some specialized symbionts. Most plants are immobile and anchored on a location and research shows they reproduce sexually by showing alternation of generations between a diploid stage and haploid stage in their life cycle (Plant, 2016).

According to the most recent research, there are approximately 260 000 species of plants on Earth. In order to ease research and studies, biologists have classified them based on the plants' taxonomy that is a classification system based on the plants' similarities and differences. As stated in the definition of plants, plants belong to the Kingdom Plantae and this kingdom is further broken down into non vascular plants and vascular plants. Plants can be divided into smaller categories based on several characteristics, (i) process of transporting fluids either they by circulating fluids through their bodies or fluids are obtained by absorbing them from surrounding's moisture, (ii) reproduction method whether by spores or seeds and (iii) size and stature (Plant Kingdom, 2013).

Non vascular plants are plants that lack conducting tissues thus unable to circulate rainwater through their body and need to absorb them from surrounding moisture. Non vascular plants can be further divided into *anthocerotophyta* (hornworts), *bryophyta* (mosses), *chlorophyta* (fresh water algae) and *hepatophyta* (liverworts). These plants breed by spores, have no flowers and usually grows on the grounds, rocks and on other plants. They are crucial foundation plant for jungles as they can prevent erosion of jungles' soil by carpeting the jungle floor. Another classification in the Plantae Kingdom is the vascular plants. Vascular plants are plants that can circulate fluids in their bodies and they can be further divided into vascular plants reproduce with spores