ANALYSIS OF PLANT PROTECTION PRODUCTS

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Abstract. *The main classes of crop protection chemicals are herbicides, insecticides and fungicides. Selective herbicides, for example, control the growth of weeds which would otherwise grow among a crop, competing with it for water, nutrients and sunlight. Without crop protection chemicals agriculture would be less efficient. Plant-based diets in comparison to diets rich in animal products are more sustainable because they use many fewer natural resources and are less taxing on the environment. Given the global population explosion and increase in wealth, there is an increased demand for foods of animal origin. The strong layer on the branches, stems and roots of trees is called bark. The bark also has many functions, such as resistance to insects also keeping the plant safe from fire. Some special tree plants have special protection system, such as the long thorns or many plants that are poisonous.*

Key words: *Plant protection, plant organs, biocontrol agents, crop rotation, biological crop*

Introduction. The term includes, amongst others: herbicides, fungicides, insecticides, acaricides, nematicides, molluscicides, growth regulators, repellents, rodenticides and biocides. Plant protection products fall into a number of categories insecticides, acaricides, fungicides, nematicides, soil disinfectants, herbicides or plant growth regulators – depending on their specific function. Plant Protection The major thrust areas of plant protection are promotion of Integrated Pest management, ensuring availability of safe and quality pesticides for sustaining crop production from the ravages of pests and diseases, streamlining the quarantine measures for accelerating the introduction of new high yielding. Plant protection methods may include the application of pesticides, biocontrol agents, and cultural practices like crop rotation and sanitation. The goal is to maintain the health and productivity of crops while minimizing the negative impacts of pests and diseases on agricultural production.

Protection tissues are located in the more external part of the plant organs and are usually in contact with the environment. There are two main protection tissues: epidermis and periderm. The epidermis is found covering the organs with primary growth and periderm covers the organs with secondary growth. Biological crop protection products are derived from naturally-occurring plant, bacterial, viral and fungal sources, some of which may even be found in your own backyard. Biologicals work in many ways. Protective sprays and dusts applied to the foliage and fruit of crops and ornamentals include a wide range of organic chemicals designed to prevent infection. Protectants are not absorbed by or translocated through the plant; thus, they protect only those parts of the plant treated before invasion by

the pathogen. While there are many ways to structure plant classification, one way is to group them into vascular and non-vascular plants, seed bearing and spore bearing, and angiosperms and gymnosperms. Plants can also be classified as grasses, herbaceous plants, woody shrubs, and trees.

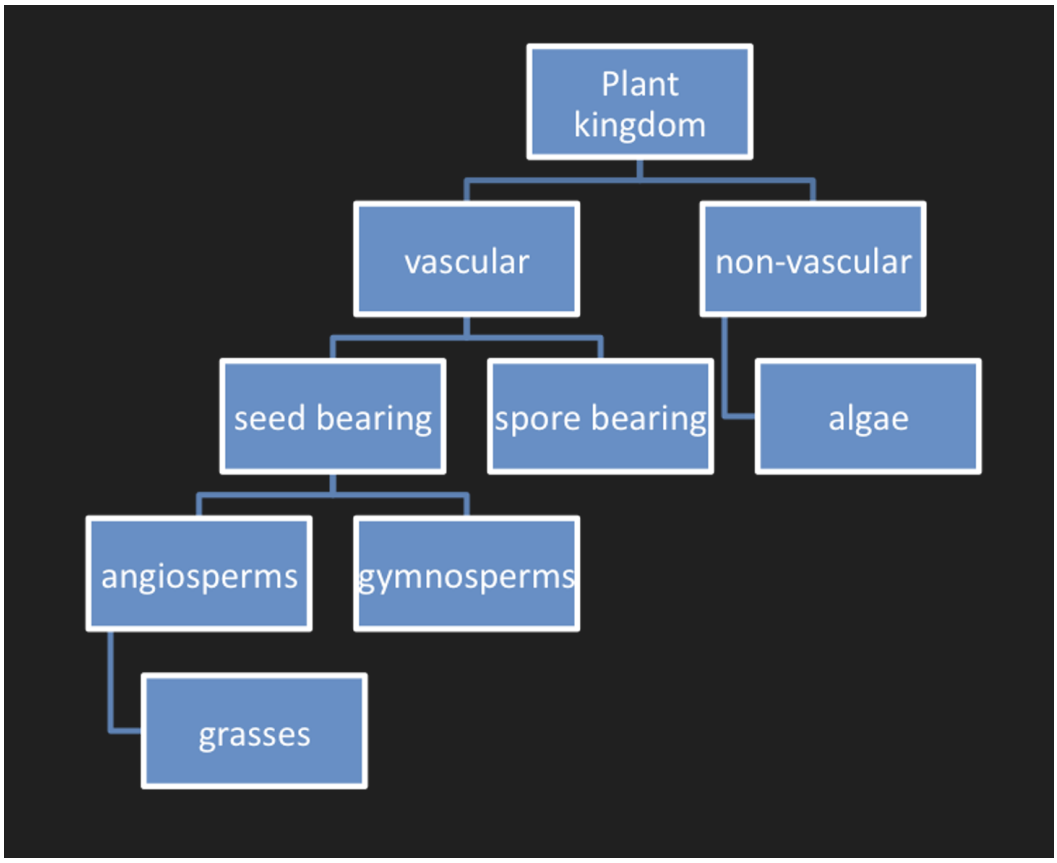

Figure1. An example of plant classification

Plant protection products, often referred to as pesticides, play a crucial role in modern agriculture, safeguarding crops from pests and diseases to ensure food security and economic viability. However, their use also raises concerns about potential environmental and health impacts. This article delves into a comprehensive analysis of plant protection products, examining their benefits, risks, and the evolving landscape of sustainable solutions. Plant protection products effectively combat a wide range of pests and diseases, including insects, weeds, fungi, and bacteria, which can decimate crops and reduce yields. This protection translates into increased food production, making a significant contribution to global food security and affordability. By reducing crop losses, these products help farmers maximize their output and ensure a stable food supply for a growing population. Despite their benefits, the use of plant protection products has been linked to various environmental concerns. The indiscriminate or excessive use of some products can contaminate soil and water sources, harm beneficial insects like pollinators, and disrupt the delicate balance of ecosystems. Furthermore, certain products have been shown to persist in the environment, posing long-term risks to wildlife and human health. The toxicity of plant protection products varies greatly depending on their chemical composition and application

methods. Exposure to these products, whether through direct contact, ingestion of contaminated food, or inhalation, can lead to a range of health problems. These can include acute symptoms like skin irritation and respiratory problems, as well as chronic conditions like endocrine disruption, neurological disorders, and even certain types of cancer. Recognizing the need to mitigate the risks associated with conventional plant protection products, there's a growing emphasis on sustainable solutions. Integrated Pest Management (IPM) is a holistic approach that combines various pest control methods, minimizing the reliance on chemical pesticides. IPM strategies include crop rotation, biological control using natural predators, and targeted pesticide use only when absolutely necessary. Biopesticides, derived from natural sources like bacteria, fungi, or viruses, offer a more environmentally friendly alternative to synthetic pesticides. These products typically target specific pests and degrade quickly, reducing the risk of persistent contamination. Stringent regulations govern the development, approval, and use of plant protection products. Regulatory agencies meticulously assess the potential risks of each product, ensuring they meet safety standards for human health and the environment. Promoting responsible use through farmer education programs, promoting best practices, and enforcing safety guidelines are essential for minimizing unintended consequences. The landscape of plant protection is constantly evolving, with ongoing research and development focused on creating safer, more targeted, and sustainable solutions. This includes innovations in biopesticides, precision application technologies to reduce chemical use, and the development of pest-resistant crop varieties through genetic engineering. The future of plant protection lies in a balanced approach that maximizes benefits while minimizing risks. By embracing integrated pest management, adopting biopesticides, enforcing stringent regulations, and promoting responsible use, we can ensure the sustainable production of food while safeguarding both human health and the environment.

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