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Review Article

Agriculture in Latin America: Integrated Pest Management, Semiochemicals, and Microbial Pest-Control Agents Actual State and Future Projections for the Balance of Heavy Metals in Polish and Dutch Agriculture

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Abstract

In relation to the traits of Latin American farmers and the tactics of funders and practitioners for IPM research and development, a few particular challenges related integrated pest management (IPM) development and acceptance in Latin America are discussed. IPM's complexity and the numerous assumptions made about the needs and issues of farmers present a hurdle. The focus is on IPM techniques including semiochemicals and microbial pesticides, which are examined from a Latin American viewpoint both for the market of IPM products and the regulatory guidelines for registration and usage of semiochemicals. Finally, a review of Latin American IPM research is presented (Bekker-Grob EW et al., 2012).

This study examines the level of heavy metal contamination in agroecosystems in relation to agricultural development. The agricultural situations in Poland and the Netherlands were contrasted for this. It was discovered that a significant portion of the heavy metal intake to these systems was caused by the extensive animal and vegetable agriculture seen in the Netherlands over the previous 20–30 years. Poland's agriculture is about to experience a dramatic economic and technological upsurge because to the country's recent EU membership. The low levels of organic fertilisation currently present in this nation are anticipated to rise sharply during the following few years, resulting in a rise in the environmental burden of heavy metals comparable to that seen in the Netherlands

As the EU assumes responsibility for the maximum limits of certain of these chemicals allowed in mineral fertilisers, awareness of the harm that heavy metals pose to public health is gradually spreading. The authors want to emphasise that using organic fertilisers is the primary source of heavy metals, nonetheless. A proper response, including feed regime adaption and/or remediation, may be necessary to both protect Poland's unpolluted soils and to halt the ongoing soil pollution in the Netherlands (Uduak CU et al., 2012).

Keywords: Bioavailability,Iron,Zinc,Selenium,Vitamins,Micronutrient,Malnutrition,Nutritionalquality, Humanhealth, Biofortification

INTRODUCTION

Integrated pest management (IPM) was defined by Kogan (1998) as a decision-support system for the selection and use of pest control tactics, either separately or in harmony with one another as part of a management strategy, based on cost-benefit analyses that take into account the interests of and impacts on producers, society, and the environment.

The existence of ecological and economic thresholds, the necessity of using the socio-ecosystem as a management unit, the availability of a wide range of IPM tools, including the prudent application of chemical pesticides, and the necessity of an interdisciplinary systems approach are all taken into account by this definition. This is especially true given that some control measures may have unintended and undesirable side effects. As a result, in order to create tools that may be used as IPM practises, IPM requires coordinated input from numerous domains of expertise (Crippen TL et al., 2009).

IPM is a decision-support system for the selection and use of pest control tactics, either separately or in concert with one another as part of a management strategy, based on cost-benefit analyses that take into account the interests of and impacts on producers, society, and the environment. This definition was provided by Kogan (1998). This definition takes into account the existence of ecological and economic thresholds, the requirement to use the socio-ecosystem as a management unit, the accessibility of a wide range of IPM tools, including the prudent use of chemical pesticides, and the requirement of an interdisciplinary systems approach. This is especially true considering the possibility of unforeseen and undesired side effects from various control approaches. Therefore, in sequence As a result, IPM requires coordinated input from many different fields of expertise in order to develop tools that may be used as IPM practises. Regarding the problems that prevent IPM initiatives in Latin America from being successful, certain general issues have been noted. These issues include a lack of technical expertise with few IPM researchers actively engaged, inadequate research and extension system infrastructure, a weak public sector that restricts information dissemination and offers ineffective credit and subsidy schemes, and the influence of agrochemical companies on governments and their agencies (e.g. Bentley and Andrews, 1996). This article examines the present state of IPM research before examining a few more topics connected to the use of IPM in Latin America, particularly those involving semiochemicals and microbial antagonists (Schjørring S et al., 2010) .

Under the premise that pollution does not exceed established criteria and productive technologies do not harm the environment, the goal of modern agriculture is to protect the production of high-quality food in a sustainable natural environment. But the rapid intensification of plant and animal production that was seen in Western Europe over the past 30 to 40 years has drastically altered the environment and disrupted healthy agro-ecosystems (Stoate et al., 2001). Additionally, it resulted in significant environmental damage and the contamination of agricultural products, which could put consumers at risk.(Teuber M et al., 2001) .

Because of this, consumer awareness sparked the change of EU food policy into a proactive, dynamic, coherent, and all-encompassing tool to guarantee a high standard of consumer and human health protection (CEC, 2000). The new EU farm to table policy clearly refers to farmers as the chain's most important link and the ones in charge of maintaining food safety **(Miranda JLet al., 2014).** .

Fragments of sections

In contrast to bottom-up Research and development in IPM (Ruel MT et al., 2013).

IPM practitioners frequently use a top-down approach to research and development that starts with scientists and managers and moves all the way down to peasants. With this method, a pest problem is identified, a suitable IPM practise is created to address it, and the solution is then given to farmers. The biological control of cereal aphids in Chile through the introduction of hymenopteran parasitoids is a well-known example of success (Zuiga, 1990). As an alternative, the "farmer first" strategy uses a bottom-up plan to identify deficiencies in (Headey D et al., 2013)

The study of IPM in Latin America

The projected returns on research, the availability of finances, the goals and objectives of local and external funding organisations, and the necessary scientific aptitude to develop multidisciplinary studies are just a few of the many variables that may have an impact on IPM research. Here are some details about IPM research and development in the region with a focus on semio chemical concerns, as well as some general issues with scientific research in Latin America (Deaton A et al., 2008)

National scale heavy metal balances

The brief comparison between Polish and Dutch agronomy shown in Table 1 amply demonstrates the contrasts between these nations' levels of agricultural production intensity (Headey DD et al., 2012).

Although the Polish agricultural area is more than nine times larger, just 27% more pigs, 32% more cattle, and almost 50% more chicken are produced there overall. Information on the number of animals per total area of agricultural land, amounts of mineral fertiliser, and manure production

DISCUSSION

In Poland throughout the 1980s, air deposition was one of the primary sources of heavy metal absorption into the soil. The Polish industry underwent restructuring and modernization after 1990. Anthropogenic strain on the environment has decreased as a result of the adoption of sophisticated production equipment in the steel, petrochemical, and chemical industry sectors. Farmers nowadays, particularly those employing organic waste as fertiliser, have taken over this position. The most prevalent manure created in

CONCLUSIONS

This essay examined a few IPM-related problems in Latin America. The intricacy of the IPM paradigm and the

significance of involving peasants in decision-making toward adoption have both been emphasised. This was demonstrated by the failure to adopt economic thresholds in both wealthy and developing nations. It is essential to give peasants the tools they need to overcome their difficulties.

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CONFLICT OF INTEREST

The author has no known conflicts of interested associated with this paper.

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