Botanical Pesticides for Pest Management

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Insect pests cause an estimated 14 per cent of the crop losses worldwide. Although, the use of synthetic pesticides has prevented further losses, the history shows that overzealous use of synthetic insecticides led to numerous problems unforeseen at the time of their introduction like acute and chronic poisoning of applicators, destruction of beneficial insects and the development of resistance to pesticides in pest populations. Government responded these problems with regulatory action, banning or severely restricting the most hazardous products and creating policies to replace chemicals of concern with those demonstrated to pose fewer or lesser risks to human health and the environment. Thus, repeated indications of pesticide toxicity have forced researchers to look for newer, eco-friendly, more potent and safer insecticides, especially from plant sources.

The use of plant extracts as insecticides can be dated back at least 4000 years. It is highly probable, however, that the exploitation of the toxicological properties of plants has an even older history. The Ayurved, which is the ancient wisdom of India, is oldest system of medicine. India has been recognized worldwide as a country where indigenous agricultural techniques evolved. Like Ayurveda, which is the science of human life, the knowledge of the plant science is documented in the form of an ancient Granth called Vriksha Ayurved. Prior to the beginning of agriculture as a means of food production, people had already defined many plant based extracts which were believed to possess insecticidal properties.

The scientific literature of the past 25 years describes hundreds of isolated plant secondary metabolites that show toxic effects to insects in laboratory bioassays and in recent years greater attention has been directed towards the discovery and development of phytochemicals or botanical pesticides. At present, there are numerous plant species that are used in developing countries for the production of pest control formulations and there are several commercial products already available in the market made from them. The real benefits of botanical insecticides can best be realized in developing countries, where farmers may not be able to afford synthetic insecticides. Though botanicals are also exploited for insect pest control, they are also said to be selective in action showing their safety towards the survival, development and dispersal of beneficial including macrobs and microbes.

But one should not think success is at hand and botanical insecticides will replace all synthetic products. These can fit very well in IPM system, wherein conservation of beneficial organisms in an agro-eco system is the major principle. Many of the plants discussed in this book are tropical /
subtropical in distribution and available to growers in developing countries. However, efficacy against pests is only one factor in the adoption of botanicals. Production, preparation or use of botanicals can mitigate against their use. Perhaps it is time to refocus the attention of the research community towards the development and application of known botanicals rather than screen more plants.

We hope that this book will be equally useful to graduate/post graduate students, researchers and extension workers as well. Vaibhavsingh Dodia and Dr. S.M. Chaudhary also deserve special mention for beautiful photography and computer graphic of title page. We appeal the readers to communicate any mistake, lacuna etc. to improve it in future.

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