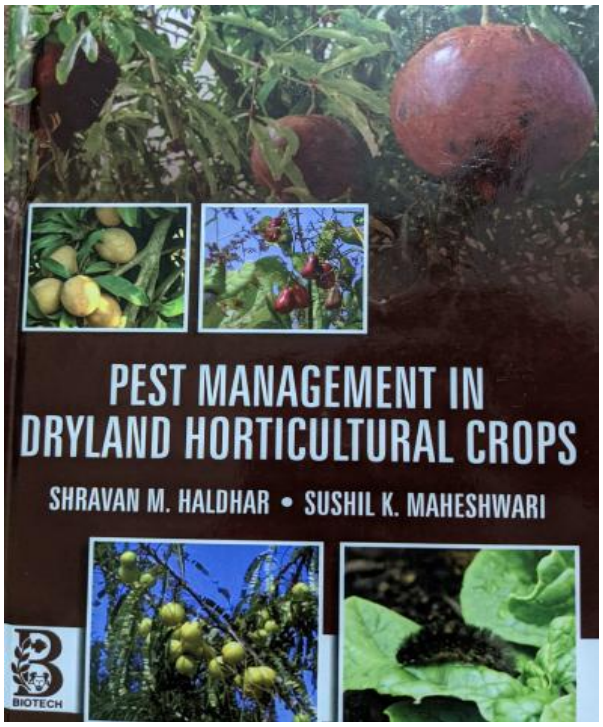
Journal of Agriculture and Ecology, 2021, Vol. 11, 78-82
http://saaer.org.in

Book Review **Open Access**

Pest management in dryland horticultural crops: book review

CN Nidhi and SM Haldhar
Department of Entomology, COA, Iroisemba, Central Agricultural University, Imphal-795004



Pest Management in Dryland Horticultural Crops. Haldhar SM and Maheshwari SK. Biotech Books, New Delhi, 2021, pp-473; ISBN: 978-81-7622-491-8.

In this book, several such interventions are given in form of various chapters which will be of immense use improving the productivity and profitability of arid and semi-arid horticultural commodities through pests management. In this endeavour, useful information has been generated on identification, damage symptoms and management of the pests in different dryland horticultural crops at various research institutions and SAUs of the country. Intense efforts have therefore, been made to gather information on identification, damage symptoms and management of pests in a systematic way, grouped in different chapters and presented in the form of a book. Accurate identification of the pest, their damage and management is the prerequisites for successful control measures. This publication contains excellent colored photographs depicting salient identification characteristics of pest, their damage on plants under natural condition and management in field conditions so as to update the knowledge of extension agencies and farmers.

The Foreword is written by Prof. M. Premjit Singh (former VC, CAU, Imphal). I congratulate to the editors for bringing out this book of pest management in time. This book will be useful to the extension functionaries and farmers in integrating various integrated pest management modules and thus increasing the income of the farmers in a sustainable way. I hope that the alarmed readers would find this publication fairly useful and remarkable.

This book has 37 chapters written by different authors with a focus on the productivity and profitability of arid and semi-arid horticultural commodities through pest's management. Chapter 1 and 2 traces the status of integrated pest management (IPM) in dryland horticultural corps. India has effectively reduced pesticide consumption without harmfully affecting the agricultural productivity. This was facilitated by suitable policies that discouraged pesticide use, and privileged to IPM application. Despite it, adoption of IPM is low unsettled to a number of socio-economic, institutional and policy constraints. On the deliver side, lack of commercial availability of biopesticides and unsuitable institutional technology transfer

mechanisms are the critical impediments to increased application of IPM. IPM is a multifaceted process and farmers lack indulgent of biological processes of pests and their predators and methods of application of new technology components. The socio-economic environment of farming is also an important issue in acceptance of IPM. There are a number of IPM practices that work best when applied by the entire community and in a synchronized mode (Haldhar et al. 2021a; Deshwal & Haldhar 2021).

Chapter 3 gives us an idea on the disease management in arid fruit and vegetable crops. Diseases are a major limitation in the production of these crops. All the major groups of pathogens cause diseases in these crops ensuing huge loss to both yield and quality. Disease management in horticultural crops particularly in the arid regions is an arduous task because of continuity of inoculum and greater proportion of endemic diseases, perennial nature of several crops and growth habit as in trees which make them unwieldy for management practices. Heavy doses of pesticides used in fruits and vegetables production for management quite often lead to toxic residues in the harvested produce. Around 13-14% of total pesticides used in the country are applied on fruits and vegetables. Knowledge of biology of the plants and the pathogen along-with package of practices of the crop is vital for formulating effective disease management strategies. Therefore, before proposing the diagnosis of any disease, eco-friendly disease management ways must be explored to protect the human beings and environment from the ill effect of excess use of pesticides (Godara 2021).

Chapter 4 is devoted to good agricultural practices for insect's pest control in dryland fruit crops. The GMP includes improved varieties, orchard management practices, resistant varieties, use of botanicals, *etc*. for better production with minimum inputs. The supervision of infestation insects is crucial for excellence creation to attain better cost of turn out in the market. Pest management is part of the additional general support of GMP and for best crop defense, exact control methods should be used in connection with the complete range of obtainable cultural techniques (rotation, crop staggering, soil tillage, integrated fertilizing, *etc*.), emphasizing the role and impact of agronomical and environmental factors (Meena et al. 2021).

Chapter 5 and 6 describes the identification of insect-pests and diseases of dryland horticultural crops. The major pest of fruit and vegetables are fruit fly, stone weevil, fruit borers, aphids, thrips, lemon butter fly, scales, datepalm scale, fruit borer, and chaffer beetles are major constraints which causing the considerable economic loss and increasing the cost of fruit production of rain fed farmers. The insect-pests impose crop losses to the tune of 40 per cent in vegetable production. The main pests of vegetable crops are red pumpkin beetle, *Aulacophora foveicollis*; fruity fly, *Bactrocera cucurbitae*; leaf miner, *Liriomyza trifolii*; pod borer, *Helicoverpa armigera*, white flies, *Bemisia tabaci*; thrips, *Frankliniella occidentalis*; shoot and fruit borer, *Leucinodes orbonalis*; Hadda beetle, *Epilachna viginctioctopunctata*; aphids, *Aphis gossypii* and ash weevil, *Myllocerus subfasciatus* (Haldhar et al. 2021b). In spite of harsh climatic conditions in arid region there are certain diseases which are prevalent and cause economic loss in the arid fruit and vegetable crops (Ramyashree et al. 2021).

Chapter 7, 8 and 9 described that host plant resistance has attained a considerable momentum recently, and has attracted the attention of scientists in evolutionary ecology, entomology, plant physiology, and biotechnology, greatly of the underlying

mechanism have still remained unanswered. There is a need to understand the insect specific signal molecules, their identification, mode of action, and further signal transduction pathway. Since the biochemical pathways that lead to induce resistance are highly conserved among the plants and elicitors of these pathways could be used as inducers in many crops. The future challenge is to exploit the elicitors of induce defense in plants for pest management, and identify the genes encoding proteins that are up and/or down regulated during plant response to the insect attack, which can be deployed for conferring resistance to the insects through genetic transformation in arid horticultural crops (Haldhar et al. 2021c; Berwal et al. 2021). Molecular breeding get great achievement in horticultural crops in the current era. This approach of crop development is continuously flourishing with the high through put techniques of genome sequencing and molecular markers developments in horticultural crops. It can greatly manage the biotic stresses in horticultural crops using molecular breeding approaches (Chetram et al. 2021).

Chapter 10 gives us about the positive and negative impact of climate change on individual patho-systems because of the specific interactions between host and pathogen. The potential effects of climate change on agriculture and incidence of pests and diseases is an important issue. The environmental, socio and economic impacts on rural farmers who are solely directly depend on the agriculture and other sensitive sectors of climate. There will be demand of apprehend for abiotic stress responses in, insect-pests, crop plants and diseases. The special consideration is required to planning for making new future strategies for managements of pest and disease with the changing climate scenarios (Meena et al. 2021).

Chapter 11-32 gives an overview of the integrated pest management (IPM and IDM) of different dryland horticultural crops like ber, aonla, datepalm, pomegranate, citus, lasora, phalsa, pilu, khejri, bael, jamun, cucurbits, beans, legumes, solanaceous vegetables, cole crops, onion, garlic and seed spices (Samadia et al. 2021; Sarolia et al. 2021). Management practices in dryland horticulture crops against pests and diseases to optimize yield via including cultural, biological, mechanical, and chemical methods. Crop management by selection of crop varieties resistant to the pests and cultural methods by tillage, pruning and flower regulation help to minimize insect and pest problems. Improve plant vigour and pest tolerance by supplying adequate plant nutrients and soil moisture, and by adjusting growing conditions as needed for optimum crop growth. Investigation of fields and surrounding areas for pest's population is required to determine economic thresholds levels and proper management measures to be integrated in sustainable manner with minimum damage to environment (Kumar et al. 2021; Sandeep et al. 2021).

Chapter 33 describe the technique of crop cultivation where in the micro climate surrounding the plant body is controlled partially or fully as per the plant requirement during their period of growth to maximize the yield and resource use is referred to as protected cultivation. But, crops grown under protected cultivation are attacked through various pests and diseases as the protected conditions provide congenial environment for development of pest populations, which often pose challenge for the success of this system. These insects-pests need to be managed properly so as to prevent the crop losses and increase yields. The primary goal of pest

management is to optimize pest control in an economically and ecologically sound way because pest control through chemicals has undesirable effects on non-targeted organisms and increase pest resistance. Therefore, protected cultivation of vegetables requires an integrated approach with the integration of cultural, physical, biological and chemical practices to manage pests to reduce pest populations for effective management of pests (Verma & Haldhar 2021).

Chapter 34 discuss about plant parasitic nematode species. A thin film of moisture is essential for the activity of the nematodes. Damage due to plant nematodes is, therefore, observed more on irrigated crops. The disease symptoms caused by nematodes are often similar to those produced due to the deficiency of nutrients. Unthrifty or stunted growth of crops in patches is often indicative of nematode attack. In India, in vegetables root-knot nematode has been reported to cause yield losses ranging between 4-40%. Worldwide crop losses due to nematode have been estimated to be of $78 billion. In arid region nematode problems are generally observed on horticultural crops. Vegetable and fruit crops grown under assured irrigation are damaged the most by nematodes (Kaul & Haldhar 2021).

Chapter 35 describe the vertebrate pests such as rodents, birds, wild boar, monkeys, bats, elephants, nilgai *etc.*, have received the attention of farming community and agriculturists as serious pests. Due to expansion of agricultural farming areas by destroying the forest lands thereby disturbing the wild animal's habitat, there is an increased human and wild animal's intervention and conflicts. Among the 103 species of rodents listed, only 13 species were found to be involved in agricultural damage at different growth stages of the crop. In case of birds of the1364 species, 63 species were identified as depredatory in nature and causing damage to various agriculture and horticultural crops mostly during vulnerable stages of the crops (Chaudhary 2021).

Chapter 36 gives the status of ITKs in dryland horticultural crops. After severe setback arising from the use of chemical pesticides on living systems and the environment, the use of indigenous tradition technology (ITKs) based pesticides is gaining momentum not only in Indian agriculture but also at global level agriculture. Traditional pesticides are good alternatives to chemical pesticides which are eco-friendly, economic, target-specific, and biodegradable. In recent era, the farmers have felt the bad effect (dangers) of use of chemical pesticides and advantages of eco-friendly traditional pesticides with respect to quality of their crop products and degradation of their soil and environmental aspects (Meena & Haldhar 2021).

References

Deshwal HL & Haldhar SM. 2021. Integrated pest management-an overview. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 17-30.

Haldhar SM, Maheshwari SK, Meena SR & Singh KI. 2021a. Integrated pest management (IPM) in dryland horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 1-16.

Haldhar SM, Maheshwari SK, Ramyashree DGS & Thounaojam S. 2021b. Taxonomy of insect-pests in dryland horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 51-76.

Haldhar SM, Sarolia DK, Reddy VR & Berwal MK. 2021c. Role of host plant resistance (HPR) in pests management of arid horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 87-98.

Kaul RK & Haldhar SM. 2021. Management strategies for nematodes in dryland horticultural crop. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 419-430.

Kumar R, Haldhar SM & Gora JS. 2021. Good management practices in pomegranate against pests. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 143-154.

Meena A, Meena JK, Ramyashree DGS, Chetram & Haldhar SM. 2021. Incidence of pest and diseases in arid horticulture with climate change. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 123-132.

Meena SR & Haldhar SM. 2021. Role of indigenous tradition technology (ITKs) in pests management of dryland horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 447-456.

Ramyashree DGS, Maheshwari SK, Haldhar SM, Kumar R & Meena A. 2021. Identification of major diseases in arid horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 77-86.

Samadia DK, Verma AK & Haldhar SM. 2021. Suitable vegetable crop-genotypes and production technology for safe pest management. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 173-182.

Sandeep Singh, Sandhu RK, Haldhar SM, Reddy PVR,, Deka S, Reddy DS, Irulandi S, Shete MH, George A, Singh V, Siraj M & Patil P. 2021. Integrated pests management in citrus crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 243-268.

Sarolia DK, Haldhar SM, Kumar L & Pareek PK. 2021. Production technology and insect-pest management of ber crop. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 133-142.

Verma AK & Haldhar SM. 2021. Management of pest in protected cultivation of vegetables for quality production. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 403-418.

Berwal MK, Chet Ram & Kumar R. 2021. Role of bioactive compound in pests management of dryland horticultural crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 99-108.

Chet Ram, Berwal MK, Gora JS, Singh D & Kumar R. 2021. Molecular breeding for biotic stress management in vegetable crops concept and practices. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 109-122.

Godara SL. 2021. Integrated disease management (IDM) in dryland fruit and vegetable crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 31-38.

Meena R, Singh RS & Sarolia DK. 2021. Good Agricultural practices for insect's pest control in dryland fruit crops. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 39-50.

Chaudhary V. 2021. Management of rodents and other vertebrate pest in dryland horticulture. *In book:* Pest Management in Dryland Horticultural Crops (*Eds.* Haldhar SM and Maheshwari SK). Biotech Books, pp: 431-446.