Chapter 8

Precision Management Practices for Legal Cultivation of Cannabis (*Cannabis sativa L.*):
Precision Management Practices for Cannabis Cultivation

Aitazaz Ahsan Farooque
University of Prince Edward Island, Canada

Farhat Abbas
https://orcid.org/0000-0002-2032-8527
University of Prince Edward Island, Canada

ABSTRACT

Cannabis (Cannabis sativa L.) growers worldwide lack reliable and research-based information about precision management practices (PMP) of cannabis. The history, legal framework, and PMP for cultivation of cannabis have been reviewed with special emphasis on water management, nutrient management, and disease control for optimum cannabis production. The aim is to provide guidelines for precision farming of cannabis to meet fibrous and medicinal needs of the humankind. Therefore, the scope of this chapter is for the potential of hemp cultivation to meet industry needs of fiber and medicine. Methods of irrigation scheduling, nutrient applications, and keeping greenhouse hygienically clean for disease-free (i.e., powdery mildew) hemp production are discussed. Reviewed and recommended application rates of irrigation and nutrients, and environment controls have been tabulated. Chemical, biological, and physical controls of PM control and crop input requirements for disease-free cultivation of hemp are presented.

INTRODUCTION

Cannabis can grow in all climate extremes with its life cycle starting from germination time of 7 days and total growing season of approximately 100-120 days. Its cultivation in North America prevails a long history recorded from the Government of the United States of America encouraging its farmers to grow the fibrous form of cannabis for meeting the country's fiber needs for clothing, rope making, and fiber sails products during 1800s (Millery, 2011). However, the immigrants from South of USA introduced amusing use of cannabis during 2000s; this forced USA to enact the Marijuana Tax Act during 1937, to effectively criminalize marijuana consumption in USA; nonetheless, USDA (the United States Department of Agriculture) incentivized farmers to grow fibrous form of cannabis to meet wartime fiber needs of the country and collating partners during World War II (Millery, 2011).

The cannabis international legal framework comprises the 1961 Single Convention on Narcotic Drugs as amended by the 1972 Protocol (UNGA, 1975), the 1971 Convention on Psychotropic Substances (UNGA, 1975), and the 1988 Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (UNESOC, 1998). The use of cannabis for scientific and thus medical purposes has been permitted under the legal framework of the European Union (EMCDDA, 2018). There has been a recent trend in some countries of decriminalizing the use of cannabis for personal use, but the current international laws still require them to regulate and control the use of cannabis. For an increased public acceptance of recreational marijuana use and challenges in controlling illegal use of cannabis in Canada, the issue of legalizing the illicit use of this drug has been raised publicly (Hajizadeh, 2016). Department of Justice of the Government of Canada on its official website https://www.justice.gc.ca/eng/cj-jp/cannabis/ details legalization and regulation of cannabis in Canada (Government of Canada, 2019).

In this book chapter, history and legal framework of cannabis cultivation, and PMP for legal cultivation of cannabis are presented by putting a special emphasis on water management, nutrient management, and disease control particularly under greenhouse situations. The aim is to promote and provide guidelines to the farmers/growers for precision farming of cannabis to meet fibrous and medicinal needs of the humankind. This chapter is concerned only with medical purpose production of cannabis.

Cannabis (*Cannabis sativa* L.) has a long history of cultivation (Schulteset al., 1974) originating from central Asia (McPartland, 2000) and has been on industrial demand for centuries to produce fibers, oils, textile products, papers, construction materials, energy, cosmetics, medicines and chemicals (Grabowskaet al., 2009; Bakroet al., 2018). Cannabis has also been used medicinally dating back approximately 5000 years (Lemberger, 1980; Pertwee, 2014). The potential use of cannabis and cannabinoids has been termed to be a source for relief medicines as painkillers, anti-emetics, anticholinergic, appetizer, and in treatment of glaucoma and epilepsy by the US and the British bodies specialized in medical services (Morris, 1997).

Cannabis: Hemp vs. Marijuana

Numerous synonyms for the word 'cannabis' have been used in literature including hemp, marijuana, ganja, hash, or hashish in North America, Europe, Caribbean, and Asia, respectively. However, English literature commonly refers to the word "cannabis". Forsyth (2000) enlisted a detailed list of synonyms comprising historic and contemporary, scientific and slang used for cannabis.

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