



Identification of new resistant sources against downy mildew disease from a selected set of cucumber germplasm and its wild relatives

Dikshant Gautam, Ranjan Nath¹, A. B. Gaikwad, K. V. Bhat, Bhola Mondal¹, Jameel Akhtar*, Gograj Singh Jat², Asif Mir Iqbal³, Badrish Tiwari and Sunil Archak

ICAR-National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi 110 012; ¹Department of Plant Protection, Palli Siksha Bhavana, Sriniketan, Vishva Bharti, West Bengal; ²Division of Vegetables, ICAR-IARI, Pusa Campus, New Delhi 110 012; ³Centre for Agricultural Bioinformatics, ICAR-IASRI, Pusa Campus, New Delhi 110 012

(Received: June 2020; Revised: September 2020; Accepted: October 2020)

Abstract

This study was undertaken to identify new sources of resistance against downy mildew of cucumber caused by *Pseudoperonospora cubensis* [(Berk. and Cart.) Rostow]. Pot experiments were conducted with 16 accessions each of *Cucumis sativus* and *C. hardwickii* during the years 2017 and 2018 using 12 isolates of *P. cubensis* representing different agroclimatic zones of India. The accession, IC331627 from Dehradun, Uttarakhand showed plant disease index (PDI) ranging from 5.55-20.35 per cent with an average PDI of 11.56 and 11.87 per cent during the years, 2017 and 2018, respectively. Hence, IC331627 was identified to be resistant against the five isolates of *P. cubensis* (Pc12, Pc17, Pc19, Pc21 and Pc24) and moderately resistant against one isolate (Pc22). This resistant accession *C. hardwickii* (IC331627) could be utilized to develop mapping population to map genomic regions conferring the resistance to downy mildew in cucumber.

Key words: Resistant sources; *P. cubensis*; cucumber; wild relatives

Introduction

Cucumber is mainly grown for its edible tender fruits, preferred as salad ingredient, pickles, dessert fruit and also cooked as vegetable preparation. It is a very good source of vitamins such as A, C and folic acid and minerals including calcium, potassium and magnesium. The total area under cultivation and production of cucumber in India is 82.04 thousand ha and 1259.94 thousand MT respectively (Anonymous, 2018). Downy mildew, a foliar disease caused by the oomycete fungus *P. cubensis*, is one of the most

destructive pathogens of cucurbits (Palti and Cohen, 1980). This disease was first described in Cuba in 1868 (Berkeley and Curtis, 1868). The symptoms of the disease in the susceptible genotypes appear mostly on foliage as small, water soaked lesions on the underside of the leaves which later become angular and turn chlorotic as they are restricted by the small leaf veins. Whereas, the resistant genotypes show hypersensitive response (HR) with small necrotic spots (Call et al. 2012).

Since several fungicides, which have earlier provided control, are reported to be ineffective because of evolution of new strains of *P. cubensis* and resistant varieties substantially reduce or eliminate fungicide requirements (Wan et al. 2010). The development of resistant cultivars is generally considered to be the best approach to control downy mildew (Olczak et al. 2011). So, identification of new sources of resistance to downy mildew is of paramount importance for agriculture and environment. Therefore, this study was undertaken with the objective to find out sources of resistance through artificial screening (pot culture) of cucumber germplasm.

Materials and methods

In order to identify the sources of resistance in cucumber against downy mildew, the pot experiments were conducted during *kharif* seasons of 2017 and 2018 at ICAR-National Bureau of Plant Genetic Resources (ICAR-NBPGR), New Delhi following

*Corresponding author's e-mail: jameelnbpgr@gmail.com