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EDITED BY
Antonio M. De Ron,
Spanish National Research Council (CSIC), Spain

REVIEWED BY
Obed Mwenye,
International Potato Center, Malawi
Yuri Shavrukov,
Flinders University, Australia
Milind Ratnaparkhe,
ICAR Indian Institute of Soybean Research, India

*CORRESPONDENCE
Ambika Rajendran
ra.rajendran@icar.gov.in

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Harnessing heterosis and male sterility in soybean [*Glycine max* (L.) Merrill]: A critical revisit

Ayyagari Ramlal [1,2], Aparna Nautiyal[3,4], Pooja Baweja[5], Rohit Kumar Mahto[1,6], Sahil Mehta[7], Bingi Pujari Mallikarunja[8], Roshni Vijayan[9], Shukla Saluja[10], Vijay Kumar[11], Sunil Kumar Dhiman[12], S. K. Lal[1], Dhandapani Raju[13] and Ambika Rajendran [1]*

[1]Division of Genetics, ICAR-Indian Agricultural Research Institute (IARI), Pusa Campus, New Delhi, India, [2]Department of Botany, Institute of Science, Banaras Hindu University (BHU), Varanasi, Uttar Pradesh, India, [3]Department of Botany, Deshbandhu College, University of Delhi, New Delhi, India, [4]DBC i4 Center, Deshbandhu College, New Delhi, India, [5]Department of Botany, Maitreyi College, University of Delhi, New Delhi, India, [6]School of Biotechnology, Institute of Science, Banaras Hindu University (BHU), Varanasi, Uttar Pradesh, India, [7]School of Agricultural Sciences, K. R. Mangalam University, Gurugram, Haryana, India, [8]Division of Genetics, Regional Research Centre, ICAR-Indian Agricultural Research Institute (IARI), Dharwad, Karnataka, India, [9]Regional Agricultural Research Station, Kerala Agricultural University, Pattambi, Kerala, India, [10]Department of Botany, Sri Venkateswara College, University of Delhi, New Delhi, India, [11]Department of Botany, Shivaji College, University of Delhi, New Delhi, India, [12]Department of Botany, Kirori Mal College, University of Delhi, New Delhi, India, [13]Division of Plant Physiology, ICAR-Indian Agricultural Research Institute (IARI), Pusa Campus, New Delhi, India

Soybean is a predominantly self-pollinated crop. It is also one of the important oilseed legumes. Soybean is an excellent crop having industrial, traditional, culinary, feeding, and cultural roles. Genetic diversity in breeding programs is of prime importance as it ensures the success of any breeding by enhancing the outcomes and results of the plants. The phenomenon wherein the progeny exhibits greater biomass (yield) and a faster rate of development and fertility than its parents is referred to as heterosis. As of now, heterosis is mainly limited to the trait of seed yield and is considered the basis for the development of better (superior) varieties. Male sterility (MS) is extensively used for the production of seeds and the improvement of crops coupled with the traditional breeding programs and molecular technology. Therefore, deployment of MS and heterosis in breeding soybean could yield better outcomes. This review aims to focus on two aspects, namely, MS and heterosis in soybean with its scope for crop improvement.

KEYWORDS

heterosis, soybean, male sterility, genetic diversity, self-pollination, seed yield

Introduction

Soybean [*Glycine max* (L.) Merrill, Fabaceae; 2n = 4x = 40] is a self-pollinated crop. It is a multifaced nutritional food crop with high amounts of proteins (40%), fats (20%), oil contents and as a medicinal crop (Hymowitz, 1970; Singh et al., 2001; Rodrigues et al., 2006; Medic et al., 2014; Rajendran and Lal, 2020; Rajendran et al., 2022;