

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION

LOK SABHA
UNSTARRED QUESTION NO. 2181
TO BE ANSWERED ON 31/07/2018

DROUGHT TOLERANT CROPS

2181. SHRIMATI POONAM MAHAJAN:

Will the Minister of AGRICULTURE AND FARMERS WELFARE
कृषि और किसान कल्याण मंत्री be pleased to state:

- (a) whether the Water Technology Centre of Indian Agriculture Research Institute undertook various projects for understanding the tolerance mechanisms of crops in drought and thermal stress environments;
- (b) if so, the details thereof including the total costs of the projects;
- (c) whether the findings of the study have led to the production of drought tolerant varieties of various crops in the country especially in the State of Maharashtra; and
- (d) if so, the details thereof?

A N S W E R

MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE AND FARMERS WELFARE
कृषि और किसान कल्याण मंत्रालय में राज्य मंत्री
(SHRI GAJENDRA SINGH SHEKHAWAT)

(a) & (b): Yes, Sir. Water Technology Centre, IARI, New Delhi undertook the World Bank sponsored project launched by ICAR viz., National Agricultural Technology Project–Team of Excellence on “*Centre for Abiotic Stresses: Crop Improvement and Management*” (1998-2003) for understanding the tolerance mechanisms of crops to drought and heat tolerance. Approximate budget for five years was around Rs.1.00 crore.

(c) The objectives of the project undertaken by WTC, IARI were to decipher the physiological mechanisms and identify donors for drought and heat tolerance, and to train scientists in the area of abiotic stress tolerance. The findings of the project published in the form of various peer reviewed research papers (**Annexure-I**) are summarised below which have given the basis for improvement for drought tolerance:-

- A mapping population of wheat cultivars WL711 x C306 was developed for the first time. Physiological basis and molecular mechanisms of hybrid necrosis in wheat and methods to overcome hybrid necrosis in wheat were developed and published for use by other scientists. WL711 x C306 derived recombinant inbred lines (RILs) mapping population was used for mapping two novel Quantitative Trait Loci (QTL) viz., (i) Yield under drought: *qGYWD.3B.1* and *qGYWD.3B.2* and (ii) Yield stability: *qDSIGY.4A.1* and *qDSI.4B.1*
- Two training programmes were conducted to train the ICAR and SAU Scientists in the area of abiotic stress tolerance viz., "*Recent Advances in Abiotic Stress Resistance in Crop Plants*", 10-30 September, 2003; and "*Physiological and Molecular Basis of Abiotic Stress Resistance in Crop Plants*", 15-30 Dec 2002).

(d) The four RILs [INGR11037 to INGR11040] were registered as genetic stocks for heat tolerance with NBPGR, New Delhi for sharing with the breeders involved in varietal improvement programme of wheat.

List of publications in peer reviewed journals emanated from the research carried out in the project:

1. R Khanna-Chopra, M Dalal, GP Kumar, M Laloraya. 1998. Biochemical and biophysical research communications 248: 712-715;
2. M Dalal, R Khanna-Chopra. 1999. Biochemical and biophysical research communications 262: 109-112;
3. M Dalal, KVS V Lakshmi, R Khanna-Chopra, S Bharti. 1999. Plant cell, tissue and organ culture 59: 151;
4. M Dalal, R Khanna-Chopra. 2001. Physiologia Plantarum 111: 297-304; G Sharma, KV Prabhu, R Khanna-Chopra 2004. Current Science, 500-503.
5. C Viswanathan, R Khanna-Chopra. 2001. Journal of agronomy and crop science 186: 1-7;
6. R Khanna-Chopra, C Viswanathan. 1998. Euphytica 106: 169-180;
7. V Chinnusamy, R Khanna-Chopra. 2003. Journal of agronomy and crop science 189: 242-249;
8. B Srivalli, G Sharma, R Khanna-Chopra. 2003. Physiologia Plantarum 119: 503-512;
9. DS Selote, R Khanna-Chopra. 2004. Physiologia Plantarum 121: 462-471;
10. R Khanna-Chopra, DS Selote 2007. Environmental and Experimental Botany 60: 276-283;
11. DS Selote, R Khanna-Chopra. 2006. Physiologia Plantarum 127: 494-506;
12. S Chauhan, RS Khandelwal, KV Prabhu, SK Sinha, R Khanna-Chopra. 2008. Journal of agronomy and crop science 191: 88-94;
13. S Chauhan, S Srivalli, AR Nautiyal, R Khanna-Chopra. 2009. Photosynthetica 47: 536-547.
14. Kadam S, Singh K, Shukla S, Goel S, Vikram P, Pawar V, Gaikwad K, Khanna-Chopra R, Singh N. 2012. Funct Integr Genomics 12: 447-64; Shukla S, Singh K, Patil RV, Kadam S, Bharti S, Prasad P, Singh NK, Khanna-Chopra. 2015. Euphytica 203: 449-467; K Singh, R Khanna-Chopra. 2010. J Plant Biol 37: 1-9

Note: For details of all publications please see https://scholar.google.com/citations?user=aJ_fgXMAAAAJ&hl=en
