503
5/11/12

RPF - I

(PROFORMA FOR SUBMISSION OF RESEARCH PROJECTS)

Part - I : General Information

200 Project Code :

2001 Institute Code No. : **C.I. 6.9**

2002 ICAR Code No. : **IXX09664**

201 Name of Institute and Division :

2011 Name & Address of Institute : **Indian Grassland & Fodder Research Institute, Jhansi-284003**

2012 Name of Division/Section : C. I. Division

2013 Location of Project : Jhansi

202 Project Title : **Identification of Functional Markers for Drought Tolerance in Pearl millet.**

203 Priority Area :

2031 Research Approach : Applied Res. / **Basic Res.** / Process /TOT of Tech.Develop.
01 **02** 03 04

204 Specific Area :

2041 Previous Project/Projects in this specific area : None
(Year, type of funding, cost, etc.)

205 Duration : 5 years

2051 Date of Start : October, 2012

2052 Likely Date of Completion : October, 2017

206 Total Cost of the Project : 10.5 Lakhs

2061 Foreign Exchange Component (If any) : Nil

207 Project Profile Summary :

Gene expression in plants is specifically regulated to ensure proper development and function of tissues, and adequate responses to environmental changes. Genes being present in the cell, they are regulated at transcriptional level to express the gene as and when required. Drought being a complex trait, several genes are expected to control this trait. Markers linked to the contributory loci (genes) would be of considerable help in development of drought tolerant varieties of pearl millet and other related crop. RIL will be used to develop mapping population and the doubled haploid technique will help fix the gene-combinations and save time. Tagging the genes underlying drought tolerance QTL will facilitate understanding molecular mechanisms of drought tolerance, and will accelerate genetic improvement of pearl millet through MAS.

208 Key Words : Pearl millet, Drought, Functional marker, Doubled haploid, RIL population.

Pl put up with file along with proceeding of IRC!
13/3/12
Dr. Nigam

Part - II : Investigator Profile

210 Principal Investigator :

2101	Name	:	**Dr. Suresh Kumar**
2102	Designation	:	Senior Scientist
2103	Division/Section	:	Crop Improvement
2104	Location	:	IGFRI, Jhansi
2105	Institute Address	:	IGFRI, Jhansi-284003, U.P.

211 Co-investigator :

2111	Name	:	**Dr. Kumar Durgesh**
2112	Designation	:	Scientist
2113	Division/Section	:	Crop Improvement
2114	Location	:	IGFRI, Jhansi
2115	Institute Address	:	IGFRI, Jhansi-284003, U.P.

212 Co-investigator :

2121	Name	:	**Dr. Pankaj Kaushal**
2122	Designation	:	Principal Scientist & Head
2123	Division/Section		Crop Improvement
2124	Location	:	IGFRI, Jhansi
2125	Institute Address	:	IGFRI, Jhansi-284003, U.P.

213 Co-investigator :

2131	Name	:	**Dr. M. G. Gupta**
2132	Designation	:	Principal Scientist
2133	Division/Section	:	Crop Improvement
2134	Location	:	IGFRI, Jhansi
2135	Institute Address	:	IGFRI, Jhansi-284003, U.P.

Part - V : DECLARATION

This is to certify that :

- the research work proposed in the Scheme/Project does not in any way duplicate the work already done or being carried out in the Institute on the subject ;
- the same Project has been/has not been submitted to any other Agency(ies) for financial support (if already submitted, identify Project & Agency) ; and
- the Investigator/Co-investigators have been fully consulted in the development of the Project and have fully undertaken their responsibility to carry out the programme as per the technical programme.

Signature of the Project Investigator : (Suresh Kumar) 03/11/12

Co-investigators : (Kumar Durgesh) (P. Kaushal) 31/11/12 (M. G. Gupta) 03/11/12

Signature & Comments of the Head of the Division/Section : Forwarded 31/11/12

Signature & Comments of the Joint Director (Research) :

Signature & Comments of the Director : 29.3.13

Annexure - IV

2213 Plan of Action :

Drought tolerant and susceptible pearl millet lines will be procured from ICRISAT, Hyderabad, on request. The seeds will be planted to multiply them as well as for preliminary validation/screening of the procured lines. Validation and screening of drought tolerant plants will be performed based on root length, proline content, relative water content etc. Anther culture technique standardization will start immediately with one or two selected pearl millet lines already available at IGFRI. This will facilitate use of the anther culture technique for doubled haploid development as soon as the F_1 hybrid is available. F_1 hybrid will be used for development of RIL mapping population utilizing off-season cropping, if possible to quickly achieve the appropriate mapping population. Anther culture technique, if successfully developed will achieve development of DH population in pearl millet. ESTs data available in the public domain for drought tolerance for pearl millet as well as other grass family will be used for the development of functional gene-based markers.

2214 Time Schedule of Activities (Milestones) :

Activity	Year (1)	Year (2)	Year (3)	Year (4)	Year (5)
Procurement of drought tolerant pearl millet lines and their validation					
Standardization of Anther culture technique					
Development of mapping population (RIL/DH)					
Identification of genomic markers for drought tolerance					
Identification of gene-based functional markers for drought tolerance					

Annexure - V

2215 Annual Targets for Each Activity :

1. **Procurement of drought tolerant pearl millet lines and their validation:**
   This activity will start in the first year with procurement of drought tolerant and susceptible lines of pearl millet from national/international sources followed by their seed multiplication and validation for drought tolerance/susceptibility. This activity will continue in the second year.

2. **Standardization of Anther culture technique:**
   Anther culture technique for pearl millet will be standardized starting from the beginning of the project and continue in the second and third years. The standardized protocol will be used for development of doubled haploids from the F_1 progenies to fix the heterotic combinations.

3. **Development of mapping population (RIL/DH):**
   After procurement of the drought tolerant and susceptible lines and their validation, seed multiplication, crosses will be made to initiate RIL/DH development. The activity will start later in the first year and continue through second, third and fourth years.

4. **Identification of genomic markers for drought tolerance:**
   After procurement of the drought tolerant and susceptible lines, their validation may be performed using known drought tolerant markers and attempts will be made to identify more genic markers for drought tolerance. The activity will start in the third year and continue till fourth and fifth years.

5. **Identification of gene-based functional markers for drought tolerance:**
   Gene-based functional markers will be developed based on ESTs information. The activity will start in the third year and continue till fourth and fifth years.