PROFORMA FOR SUBMISSION OF RESEARCH PROJECTS

PART –1 : GENERAL INFORMATION

200	**Project code**	
2001	Institute Project Code No.	**IGFRI CI 5.4**
2002	ICAR Project Code No.	
201	**Name of Institute and Division**	
2011	Name & Address of Institute	Indian Grassland and Fodder Research Institute Jhansi – 284003 India
2012	Name of Division/section	Crop Improvement Division
2013	Location of Project	IGFRI, Jhansi
202	**Project Title**	**Basic studies on apomixis and generating cytogenetic stocks in *Pennisetum* and *Panicum* agamic complex**
203	**Priority area**	Genetic improvement of forage crops
2031	Research Approach	Applied Research 01; Basic Research 02; Process /or technology Development 03; Transfer of Technology 04 **02 and 03**
204	**Specific area**	Forage crop improvement
205	**Duration of Project**	
2051	Date of start	2010
2052	Date of completion	2015
206	**Total cost /expenditure incurred**	21.5 Lakh
2061	**Foreign Exchange component (if any)**	No
207	**Project profile summary**	Please see annexure
208	**Key words**	Guinea grass, Pearl millet, cytogenetics, ploidy-levels, *Pennisetum*, interspecific hybridisation, alien introgression

Part - II: Investigator Profile

210	**Principal investigator**	
2101	Name	**Dr. Mridul Chakraborti**
2102	Designation	Scientist
2103	Division/section	Crop Improvement
2104	Location	Jhansi
2105	Institute Address	IGFRI Jhansi – 284003

211	**Co-investigator**	
2111	Name	**Dr. D. R. Malaviya**
2112	Designation	Principal Scientist
2113	Division/section	Seed Technology Division
2114	Location	Jhansi
2115	Institute Address	IGFRI Jhansi – 284003

212	**Co-investigator**	
2121	Name	**Dr. A. K. Roy**
2122	Designation	Principal Scientist
2123	Division/section	GSM Division
2124	Location	Jhansi
2125	Institute Address	IGFRI Jhansi – 284003

Part - III: Technical Details

220 Introduction and objectives:

2201 Origin of the project: (Problem identification)

The development of new approaches to improve breeding efficiency of tropical forage grasses is of great importance. Screening for apomixis in progeny and in the wild, to detect the type of apomixis and to analyze the principal morphological and functional regulation of apomictic seed formation is one such component. Apomixis is an asexual mode of plant reproduction through seeds. A common feature of all apomicts is the autonomous development of embryos and the generation of progenies that are exact genetic replicas of the mother plant. The aims of studying apomixis are to unlock the diversity of apomictic plants and to make it feasible to transfer apomixis to agriculturally important genotypes. Molecular techniques will be useful to study the organization of agamic complex of apomictic plants and to identify the genes responsible for apomixes. *Pennisetum* and *Panicum* agamic complex can be utilized for such detailed characterization.

Pearl millet (*Pennisetum glaucum* L.) is a dual purpose crop (food and fodder) popular amongst farmers because of its productivity, drought tolerance and nutritional quality. It is also a preferred crop for cytogenetic analysis because of its low chromosome number ($2n$=14), shorter life cycle, protogynous flowering, large number of seeds per plant and high responsiveness to artificial pollination. One of the approaches for pearl millet improvement is to conduct studies on genetic and genomic make up through interspecific hybridisation. Most of the species, with potential for pearl millet improvement, are wild, polyploid and belong to secondary and tertiary genepool, which limits the success of interspecific hybridisation with diploid pearl millet. Enhancement in ploidy status in cultivated pearl millet to tetraploid level has proved useful for improving success rate in hybridisation. Further, such interspecific hybrids are important resources to develop alien addition lines, which in turn may provide desirable material for genome analysis, gene introgressions and molecular mapping studies. Further, induced polyploids when coupled with appropriate hybridisation schemes may yield a variable ploidy series with increments on haploid genome dose whose study may yield information on ploidy dependent gene regulation. In view of these, a project on generation of cytogenetic stocks in pearl millet for interspecific hybridisation and alien gene introgressions in envisaged.

Ploidy series from 3x to 9x and mapping population from the cross of sexual and apomictic guinea grass is already available. This may be useful for study of ploidy