

PROFORMA FOR SUBMISSION OF RESEARCH PROJECTS

PART - 1 : GENERAL INFORMATION

200	Project code	
2001	Institute Project Code No.	CJ - 208
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	Development of high yielding dual and multicut fodder oats
203	Priority area	Genetic improvement of forage crops Applied and Basic research
2031	Research Approach	Applied Research Basic Research Process /or technology Development Transfer of Technology 01 02 03 04 01, 02 and 03
204	Specific area	Plant Breeding, Genetics
205	Duration of Project	
2051	Date of start	Rabi 2010-11
2052	Date of completion	Rabi 2014-15
206	Total cost /expenditure incurred	Not applicable
2061	Foreign Exchange component (if any)	No
207	Project profile summary	? See Annexure - I
208	Key words	Oats, <i>Avena</i> sp., dual, multicut, hybridisation, gene introgression, Genetic resources, germplasm, fodder crops

Part - II : Investigator Profile

210	Principal investigator	
2101	Name	Dr. S. Ahmed
2102	Designation	Senior Scientist (Plant Breeding)
2103	Division/section	Crop Improvement Division
2104	Location	Jhansi
2105	Institute Address	IGFRI Jhansi - 284003
211	Co-investigator	
2111	Name	Dr. A. K. Roy
2112	Designation	Principal Scientist (Genetics)
2113	Division/section	Grassland and Silviculture Management Division
2114	Location	Jhansi
2115	Institute Address	IGFRI Jhansi - 284003
213	Co-investigator	

2131	Name	Dr. A. B. Mazumdar
2132	Designation	Principal Scientist (Animal Biochemistry)
2133	Division/section	Plant Animal Relationship Division
2134	Location	Jhansi
2135	Institute Address	IGFRI Jhansi - 284003

Part - III: Technical Details

220 Introduction and objectives:

2201 Origin of the project: (Problem identification)

Genus *Avena*, family Poaceae comprises of approximately 70 different species some of which such as *A. sativa*, *A. sterilis*, *A. byzantina* etc. are agriculturally important for feed, fodder and food.

Avena sativa L. also known as white oat, ranks sixth in world cereal production and widely cultivated for fodder, feed and food. An introduced crop in India, its center of origin is reported to be in Asia Minor. It is grown in rabi season in India and is adopted well by the farmers because of high quality grain and fodder from dual purpose lines, high quality fodder from multicut lines, high yield of nutritious palatable fodder. Crop is widely grown in UP, MP, Haryana, Punjab, HP, Rajasthan, Bihar, Gujarat, AP, J& K and hilly tracts of southern plateau.

Because of high quality fodder from multicut lines during lean periods and high quality grain cum fodder from dual purpose lines the crop has proved to be outstanding winter forage particularly for the urban/ semi urban dairies supplying the big cities. So it may be safe to claim that oats can bring a winter forage green revolution.

Uses : Oats is used as green crop, hay and silage for animals. Most of the oat grain world wide is consumed as animal feed. It is mainly fed to dairy cattle, horses, mules and turkeys, with lesser quantities fed to hogs, beef cattle and sheep. Oat hulls, a food processing by-product are used as an animal feed, fuel for power plants and in chemical industry.

Grain as human food is increasing worldwide because of nutritional attributes. The amount of oats used for human consumption has increased because of the dietary benefits associated with phytochemicals, such as β -d-glucan, present in the grain. β -Glucan helps to control blood glucose, cholesterol and an anti-carcinogenic agent, tendency to reduce onset of colorectal cancer, increased stool bulk, mitigation of constipation for humans.

As the pressure on cultivated land is increasing at a high pace it becomes important for the breeders to develop varieties that can fit in different cropping systems. Keeping this in view, efforts at IGFRI, Jhansi are being made on following three major lines

- ◆ Development of single cut cultivars with non - lodging and erect types of nature ideal for intercropping with legume forages like pea, berseem, senji etc.
- ◆ Development of dual purpose types
- ◆ Development of multicut late flowering and high tillering varieties

2202 Definition of the project: To improve productivity of fodder oat, the project aims at development of high yielding dual and multicut fodder oats cultivars

Dr. S. Ahmed	Project planning and execution monitoring, Breeding, Hybridization, Evaluation, characterization of segregating progenies	5 months
Dr. A. K. Roy	Project planning and execution, Hybridisation, genetic resource, genetics	2 Months
Dr. A. B. Mazumdar	Screening for nutritional parameters	1 month

2212: Methodology:

The work will have following main aspects being attended simultaneously:

Evaluation and enrichment of genetic diversity:

Available germplasm will be evaluated to identify lines for suitable traits. Efforts will also be made to procure new germplasm lines from various exotic sources such as Nordic Gene bank, USDA etc. for enriching our germplasm base. Literature survey and germplasm requests will be made.

Identification of plant types with multicut and dual purpose traits:

The available and newly procured germplasm will be tested under different situations and suitable lines will be identified having desirable traits. Genetical studies will be made to identify suitable plant types. Station trials for dual purpose, multicut and single cut will be carried out on lines selected from germplasm for desired morphological attributes. Association of traits and their relative contribution towards yield will give a picture about the traits, which needs to be given much emphasis. Selected material will be advanced and further studied for different attributes. Large scale multiplication and purification of selected lines will be carried out so that they will be further tested under coordinated trials under different climatic condition of the country, to achieve real potential of the selected lines.

Development of new hybrids:

Intervarietal and /or interspecific hybridisation will be carried out to get new hybrids for the development and identification of suitable plant types from the segregating progenies.

2213: Plan of action: The execution of project will involve following steps:

- Evaluation of available germplasm and advance generations from crosses for identification of lines for suitable traits.
- Station trial of selected germplasm lines and advance breeding material for desired attributes
- Conductance of All India coordinated trial
- Procurement of germplasm suitable for dual purpose and its evaluation alongwith advanced breeding lines
- Screening for insect – pest infestation and disease tolerance
- Evaluation for quality parameters of selected lines

2214: Time schedule for activities (milestones)

Description of activity	Time (months)
Evaluation of existing and newly procured germplasm	48
Identification of donors for dual purpose & multicut types	60
Identification of donors for hybridization	60
Station trials on selected donors under dual and multicut system	48
Intervarietal and /or interspecific hybridisation	48
Evaluation of segregating progenies	48
Station trials on selected lines for single cut situations	48

Evaluation for nutritional parameter of selected lines	48
Advancement of different selected lines / progenies	36
Multiplication and purification in selected lines	36

2215: Annual Targets for each activity:

Description of activity	1st year	2nd year	3rd year	4th year	5th year
Evaluation of existing and newly procured germplasm	√	√	√	√	
Identification of donors for dual purpose & multicut types	√	√	√	√	√
Identification of donors for hybridization	√	√	√	√	√
Station trials on selected donors under dual and multicut system		√	√	√	√
Intervarietal and /or interspecific hybridisation		√	√	√	√
Evaluation of segregating progenies		√	√	√	√
Station trials on selected lines for single cut situations		√	√	√	√
Evaluation for nutritional parameter of selected lines		√	√	√	√
Advancement of different selected lines / progenies			√	√	√
Multiplication and purification in selected lines			√	√	√

2216: Estimated man-months: 40 man-months (8 months/year for 5 years)

222 Proposed Research details:

2221 Importance of the Proposed Project (gaps in knowledge/products/process technology) to the institute mandate.

The oat crop has been utilised for grazing and grain production throughout the world on large range of soils and climates and also used as feed & feedlot for cattle. Grain oat as human food is increasing worldwide because of nutritional attributes attached to it. A lot of work on oat genetics and breeding is also going on. Development of high yielding varieties of forage crops is the mandate of the division and the institute. The oat crop is widely accepted among farmers as winter season forage because of its multicut nature, high productivity and quality. The farmer prefers Berseem over Oats in northern and central India because of multicut nature of Berseem. The development of multicut oats will encourage the farmers to get higher quality, green foliage from oat. Besides the development of dual purpose forage oat will give an added advantage to the farmers because of growing demand of oat grain in Indian subcontinent.

2222 Questions attempted to be answered.

Development of high yielding dual and multicut fodder oats will help the farmers in getting higher forage and grain yield with limited resources.

2223 Anticipated process/products/Technology/ Knowledge Expected to be evolved by pursuing the project:

Lines developed will be of

- Dual purpose nature
- Multicut nature
- Single cut nature with high biomass yield

2224 Practical Utility of anticipated Results of the project:

- 2361 Field preparation/planting/harvesting (man days/cost) ✓
 2362 Intercultivation & dressing (man days/cost)
 2363 Animal maintenance
 2364 Any other item
 2365 Justification of above
 237 Equipments:
 2371 Equipments already available to be used in the project with cost:
 2372 Equipments to be purchased with cost (already in plan document)
 2373 Justification for each additional equipment
 2374 Equipment to be imported
 2375 Justification for import
 238 Additional infrastructure facilities(if needed)
 239 Financing organization

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 project.
- The same project has been / has not been submitted to any other agency for financial support
- The investigator/ co-investigator have been fully consulted in the development of project and have fully undertaken the responsibility to carry out the programme as per the technical programme.

Signature of the Project Investigator: Dr. S. Ahmed

Co-investigators:

1. Dr. A. K. Roy

2. Dr. A. B. Mazumdar

Signature & Comments of the Head of the Division /section

RPF1 is as per recommendations of IRO

HEAD OF DIVISION

फसल सहाय विभाग

CROP IMPROVEMENT DIVISION

भारतीय चरागाह एवं चारा अनुसंधान संस्थान, जयपुर
 Indian Grassland And Fodder Research Institute, Jaipur

Signature & Comments of the Director

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Forwarded
 Sanjiv Kumar
 04.08.2010

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207 Project Profile Summary

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Shahid