APS-3539: Characterization of mulberry growing soils for nutrient management in selected seri-villages of Golaghat district of Assam

CENTRAL SILK BOARD
MINISTRY OF TEXTILES: GOVT. OF INDIA
BTM LAYOUT, MADIVALA
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Regional Sericultural Research Station,
CENTRAL SILK BOARD,
GOVT. OF INDIA; MINISTRY OF TEXTILES
JORHAT- 785005, ASSAM

PART I: GENERAL INFORMATION

1.	Name of the institute (University/Organization submitting the Project Proposal)	Regional Sericultural Research Station, Central Silk Board, Ministry of Textile, Govt. of India , Jorhat-785005 , Assam
2.	Status of the institute	Regional R&D institute
3.	Name(s) and designation(s) of the Executive Authority of the Institute/University forwarding the application	Director, Central Sericultural Research &Training Institute, Central Silk Board, Berhampore - 742101, West Bengal
4.	Project title	Characterization of mulberry growing soils for nutrient management in selected seri-villages of Golaghat district of Assam
5.	Category of the project	Extension
6.	Section area	Extension & Improvement
7.	Duration	April, 2015– March, 2017
8.	Total cost	Rs. 8.46 lakhs
9.	Is the project single institutional/ multi-institutional	Multi- institutional
10.	If the project is multi-institutional, please furnish the following: Name, Designation and Address of the Project Coordinator.	Multi-institutional Dr. S. K. Singh Director ICAR-National Bureau of Soil Survey and Land Use Planning, Amravati Road, Nagpur-440033

11. Project summary:

Soil plays a major role in growth and development of mulberry plantation. There is no information on nutrient status of mulberry growing soils in Golaghat district of Assam. Golaghat district is one of the important Sericultural districts of Assam. However, wide variation in Mulberry leaf yield is observed in the district, ranging from 8 to 16 MT/ha. Due to lack of soil information, 80-90 percent of mulberry farmers are not using fertilizer (N,P,K) out of 1873 mulberry farmers while indiscriminate use of fertilizers is being practiced by the remaining farmers without following any technology. This results in low productivity of mulberry leaf and deterioration of soil health. In view of the above facts, the present project has been proposed.

PART II: PARTICULARS OF INVESTIGATOR

12.	Name Date of birth Sex Indicate whether Principal investigator/Co-investigator Designation Department Institute/University Address	Dr. S.N. Gogoi 01.11.1958 Male Principal Investigator Scientist-D Regional Sericultural Research Station, Central Silk Board, Ministry of Textile, Govt. of India ,Jorhat-785005 (Assam)
13	Name Date of birth Sex Indicate whether Principal Investigator / Co-investigator Designation Department Institute/University Address	Dr. K. D. Sah 27.05.1958 Male Principal Investigator Principal Scientist & Head ICAR-National Bureau of Soil Survey & Land Use Planning, Regional Centre, Jorhat – 785 004, Assam
14	Name Sex Indicate whether Principal Investigator /Co-investigator Designation Department Institute/University Address	Dr. S. Nirmal Kumar Male Director Central Sericultural Research and Training Institute, Central Silk Board, Ministry of Textiles, Govt. of India, Berhampore. West Bengal
	Name Sex Indicate whether Principal Investigator /Co-investigator Designation, Department Institute/University Address	Dr. S. K. Singh Male Director ICAR-NBSS&LUP, Amravati Road , Nagpur-440033
15	No. of projects being handled by each investigator at present 1. Dr. S. N. Gogoi 2. Dr. K.D. Sah	 :3 :8
	Proposed Research fellow	-

PART III: TECHNICAL DETAILS OF PROJECT

17. Introduction:

Assam occupies a significant position in the country's Sericultural map. The state contributes 110 MT of Muga raw silk, 554 MT of Eri raw silk and 18 MT of Mulberry raw silk per annum. Among the 23 districts of Assam, Golaghat is one of the important Sericultural district where 5969 numbers of families in Eri , 1011 numbers in Muga and 1873 numbers in Mulberry are engaged in sericulture activities. The district occupies an area of 3502 km² and lies 100 m above mean sea level. It is surrounded by the river Brahmaputra to the north, the state of Nagaland to the south, Jorhat district to the east and Karbi Anglong and Nagaon district to the west. Dhansiri is the principal river.

Mulberry is cultivated in a variety of soil types. The productivity of the Mulberry is decreasing day by day. The increasing land use intensity without supplement of balanced use of fertilizers have caused severe fertility deterioration of soils leading to decline in the productivity of mulberry leaf in Assam. Blanket fertilizer recommendation widens further the variability and enhance the risk of soil degradation in terms of depleted soil organic carbon and nutrient stock, increase in salinity/ sodicity, change of soil pH, rise in the level of greenhouse gas emission and environmental pollution.

Soil quality is the capacity of soil to function within natural or managed ecosystem boundaries to sustain plant and animal productivity, maintain or enhance water and air quality and support human health and habitation (Karlen *et al.*, 1997). Soil quality cannot be measured directly; it must be inferred from a wide range of soil properties (physical, chemical, and biological) that influence the capacity of soil to perform effectively. It also varies with time, climate, rainfall, and plants and human factors (Arshad and Martin, 2002; Doran, 2002).

The main reasons of soil quality degradation are the inadequate and imbalance application agrochemicals (fertilizers, pesticides, herbicides, and insecticides) to the soils (Majumdar,et.al. 2002; Sharma,et.al. 2003). Besides, frequent occurring dry spells during rainy season and short winters due to rise in temperature have also enhanced soil fertility deterioration in agricultural areas (Urkurkar, et.al. 2010).

Intensive agriculture without adequate and balanced use of chemical fertilizers, non-eco-friendly tillage practices, and with little or no use of organic manure caused severe fertility deterioration of our agricultural soils, resulting in stagnating or even declining crop productivity (Barua and Bora, 1975).

Rice (*Oryza sativa*) and tea (*Camellia sinensis var. assamica*) are the predominant crops in Golaghat district of Assam. The farmers of this area use, on an average, 182 kg nutrient/ha annually (132kg N + 27kg P + 17kg K + 4kg S, and 2kg Zn, Statistical Hand Book of Assam, 2009). Frequent use of chemical fertilizers to soil results in steady decline in fertility and loss of productivity. The same is true in Assam, where the main attention has been focused on maximizing the yield using nitrogenous chemical fertilizers. The over use of NPK fertilizers not only affects the soil quality, but also affects the carbohydrate and protein content of wheat, maize, grams, and so on, grown on over fertilized soil (Yadav, *et al.,*2005). The vegetables and fruits grown on over fertilized soil are more prone to attacks by insects and diseases (Sultani *et al.,* 2007; Singh *et al.,* 2010).

The demand for increasing raw silk production is mounting up for maximum utilization of mulberry silk among the people in Assam. To meet the demand, there is important need of high crop productivity rate, which is only possible when the soil is fertile. The knowledge of the fertility status of soil is very much essential for judicious application of fertilizers and its amendments for higher crop production.

Soil testing plays an important role in the use of fertilizers and other agricultural inputs. Soil test summaries and soil fertility maps are necessary as reference materials for scientific management of soil. Different indicators and parameters such as soil texture, bulk density (BD), water holding capacity (WHC), pH, electrical conductance (EC), soil organic matter (SOM), available nitrogen (AN), available phosphorous (AP), exchangeable potash (AK) and concentrations of macro/micronutrients are appropriate for describing soil quality and agricultural productivity (Bowman *et al.,* 1999; Palm *et al*., 2007). In view of the present scenario to achieve higher crop yield from our limited land resources, the present study is undertaken to draw a general picture of fertility level of soils in and around mulberry garden belts of Golaghat district of Assam in order to strengthen the national and local soil quality database so that purpose-oriented soil assessments and predictions can be made in the area. This information will also help to adopt effective strategy on fertilizer use and cropping pattern.

18.1 Definition of the project:

Mulberry farmers of Golaghat district, Assam apply chemical fertilizers in the mulberry garden at random due to lack of awareness of appropriate nutrient management. Such

misappropriation in the application of fertilizer input results in soil fertility degradation and is supposed to upset the economics of mulberry production. Application of fertilizers following soil test-based approach is the only solution in this regard. Therefore, this technology is to be popularized among the farmers at large.

18.2 Origin of the problem/rationale of the study

Mulberry growing soils of Golaghat district are acidic in reaction and are also deficient in available nutrients, resulting in low productivity. Farmers of this area generally apply fertilizers in the mulberry garden at random due to lack of awareness about appropriate nutrient management. Hypo- and hyper-doses of fertilizer application leads to yield decline and also increase in soil pollution. Application of fertilizers following 'soil test-based' approach is the only solution to increase productivity of mulberry. However, adoption of improved technologies, like application of chemical fertilizers reduces the variability in productivity among the mulberry farmers. Therefore, it is urgent to find out soil nutrient status of mulberry garden of Golaghat district of Assam for proper application of chemical fertilizers in fields.

The project will generate information about appropriate measures to enhance the productivity which may have better acceptability. It will help to take measures and reduce variability among the farmers and increase yield in the field.

18.3 Relevance to the current issues and expected outcome

General awareness will be created among the farmers about judicious use of fertilizer application based on soil test.

18.4 Objectives

(i) To characterize and classify the mulberry growing soils and prepare a data bank.

(ii) To prepare soil test based fertilizer recommendation chart for the mulberry growing soils.

(iii) To popularize the 'soil test-based' fertilizer application among the farmers as per the fertility rating chart developed.

19 Review of status of research and development on the subject

19.1 International status

There are no reports available on yield gap in mulberry even though the same are available for the other crops. Gomez (1977) reported the methodology for assessment of yield constraints to higher yield on Asian rice farms in the Philippines. In many developing countries, yield of rice varieties are 1-5 tones/ha while the potential yield of modern rice varieties are 10-11 tones/ha under tropical humid condition. At field level, yield differences among the farmers in the same area are frequently observed because of different level of crop management and diversity of environments.

National status

The present fertilizers recommendations which are being adopted in each agro-climatic region are much generalized and have no due consideration of different soil types occurring in the region and prevailing resource constraints of the farmers.

The Central Silk Board has developed soil test-based technology (Bose and Kar, 2010), dealing with nutrient status-based input application, *i.e.,* fertilizers and manure to restore soil fertility and improvement of soil health, besides reducing input cost, thereby improving the productivity and quality, cost efficiently.

Therefore, a study on productivity and profitability of mulberry sericulture in Assam has been proposed to find out the reasons of low productivity in leaf and cocoon yield per unit area for suggestions and remedies

19.3. Importance of the proposed project in the context of current status

Loss in leaf productivity of mulberry, grown on nutrient deficient soils of Golaghat is needed to be averted through appropriate fertilizers management, based on the technology developed at RSRS, Jorhat, Assam.

19.4 Anticipated products, progress/technology package, information or other Outcome from the project and their expected utility.

Feedback information from the farmers' field trials is anticipated to be utilized the extend of the technology to the farmers at large.

19.5 Expertise available with proposed investigation group/ institution on the subject of the project

High degree of expertise and experienced scientific man-power are available at the RSRS, Jorhat for mulberry plantation management and also the soil scientist expertise at the NBSS&LUP, Jorhat, Assam.

19.6. List of the five experts in India in the proposed subject area:

S. No	Name	Designation	Address
1			
2			
3			

20. Work plan: The objective wise work plan for the project is as follows:

Objective (i): To characterize and classify the mulberry growing soils and prepare of data bank:

- Five mulberry growing blocks namely Dergaon, Bokakhat, Kakodongha, Sarupather and Kothalguri of Golaghat district are selected for the study area. Soil survey will be conducted in the entireset of 32 villages field under mulberry cultivation comprising 400 ha area approximately.
- Soil profile study will be conducted in each seri village and horizon wise soil samples will be collected from the representative profiles for analysis. The soil will be classified as per USDA (United States Department of Agriculture) soil taxonomy. Apart from profile samples, composite surface soil samples (0-45 cm) from the farmer's field will be collected for fertility evaluation and monitoring.
- Data bank will be prepared from the generated data.

Objective (ii):To prepare soil test based fertilizer recommendation chart of the mulberry growing soils.

- Composite surface soil samples (0-45 cm) collected from the farmers field will be analyzed for texture, pH, EC, O.C., CEC, Exchangeable Cations, available NPK, micronutrients Cu, Mn, Fe, Zn and B.
- Based on the soil test report, fertilizer recommendation chart for the individual farmers field will be prepared as follows:
  - (i) Recommendation for soil reclamation if required
  - (ii) Recommendation for nutrient management.

Objective (iii): To popularize the 'soil test based' fertilizers application among the farmer's as per the fertility rating chart developed.

- Soil test based fertilizer recommendation chart will be tested with the field trials in the farmer's field.
- Field trials in the farmer's field will be conducted in different locations depending on the variability of the soils.
- Field experiment will be conducted using the Randomized block design (RBD) and performance of fertilizer dose will be evaluated through statistical t-test.
  Highly significant treatment of fertilizer dose will be considered for recommendation and popularization in the farmer's field.

M**ethodology:**

- ❖ Selection of sericulture farmers
- ❖ Collection of soil samples from different mulberry growing areas
- ❖ Analysis of soils samples
- ❖ Application of soil test based dose of fertilizer and recommended dose of fertilizer against existing one for comparison
- ❖ Recording of crop-wise growth characters and leaf yield leaf yield data for one year
- ❖ Compilation of data, statistical interpretation and preparation of final report

Method of collection of soil samples

Composite soil samples will be collected from the farmer's field of each Sericultural village for analysis of texture, pH, EC, OC, CEC, Exch. Cations, available Macronutrients (N, P, K) and available micronutrients (Fe, Mn, Cu, Zn). From each village two soil profiles will be taken based on the variation in the soils and horizon-wise samples will be collected from each profiles. Similar analysis from the profile samples will be done following standard procedure.

20.2 Organization of work Elements

S N.	Name	Designation	Time to be spent	Work to be done
1	Dr. S. N. Gogoi	Scientist–D	60 %	Literature review, formulation of project, collection of soil sample, field experiment in farmer's field, collection of data for growth and yield parameters, and preparation of final report.
2	Dr. K.D. Sah	Principal Scientist	40%	Collection of soil samples, analysis of soil samples, preparation of nutrient recommendation chart, field experiment, statistical analysis and preparation of draft report.
3	Dr. S. Nirmal Kumar, Coordinator	Director		Coordination and overall supervision.
4	Dr. S.K. Singh, Coordinator	Director		Coordination and overall supervision.

20.3 Proprietary/patented item, if any, expected to be used for this project: NA

20.4 Suggested plan of action for utilization of the expected outcome from the project:

Feedback information from the farmer's field trials is anticipated to be utilized the extend of the technology to farmer's community. The outcome of the project will help in economic up-lifting of poor/weaker section of the society through enhancement of quality leaf yield and cocoon production.

20.5 Time schedule of activities / milestone

S. No	Milestone/Activity	Expected Date of		Expected Outcome
		Starting	Closing	
1	Selection of farmers	April,2015	May, 2015	General awareness about judicious use of fertilizer application based on soil test will be created among the farmers.
2	Collection of soil samples	April, 2015	June, 2015	
3	Analysis of collected soil samples	May, 2015	Sept., 2015	
3	Collection of yield attributing characters and leaf yield of plant	April,2015	May, 2015	
4	Application of fertilizers based on soil estimation report	September, 2015	October, 2015	
5	Recording of yield attributing characters of plant leaf yield	April,2016	October, 2016	
6	Compilation and data analysis.	Nov.,2016	Dec., 2016	
7	Finalization of report	January, 2017	March, 2017	

17.6 Project Implementing Agency/Agencies

Name of the Agency	Address of the agency	Proposed amount (in laks)	Cost sharing (%)
Central Silk Board	Central Silk Board; Ministry of Textiles: Govt. of India; Bangalore - 560 068	8.46	100

PART IV: BUDGET PARTCULARS

18. BUDGET (In lakh): [in case of multi-institutional projects, the budget details should be provided separately for each of the institute]

BUDGET for NBSS&LUP, Regional Centre Jorhat

A. Non-recurring (e.g. equipments, accessories, etc): Not applicable

B. Recurring: **B1.Manpower: NA**

B2. Consumables:

Sl No	Item	1st Year	2nd Year	Total (Rs. In lakhs)
B21	Stationery	0.25	0.25	0.50
B22	Chemicals and glasswares	1.00	1.00	2.00
B23	Soil survey work (including POL, labour charge, TA & DA for Scientist and technical staff)	1.50	0.50	2.00
B24	Miscellaneous	0.10	-	0.10
B25	Intellectual charges	0.23	0.23	0.46
Total(B21+B22+B23+B24+B25)		3.08	1.98	5.06

BUDGET for RSRS, CSB, Jorhat

A. Non-recurring (e.g. equipments, accessories, etc) : Not applicable

B. Recurring(**Manpower): NA**

B2. Consumables:

S.N.	Item	1st yr	2nd yr	Total (Rs. In lakhs)
B21	Stationery	0.25	0.25	0.50
B22	Chemicals and glasswares	-	-	-
B23	Field work for implementation including TA & DA for Scientist and technical staff)	0.50	0.50	1.00
B24	Soil management for 20 farmers field	0.50	0.50	1.00
B25	Cost of fertilisers	0.30	0.30	0.60
B26	Cost of plant protection measures	0.10	0.10	0.20
B26	Miscellaneous	0.10	-	0.10
Total(B21+B22+B23+B24+B25+B26)		1.75	1.65	3.40

PART V: EXISTING FACILITY

19. Available equipment and accessories to be utilized for the project: Soil survey and analysis will be done with the existing facilities of ICAR- NBSS&LUP, Regional Centre, Jorhat. Cost chemical will be arranged from CSB.

Part VI: REFERENCES

1. Bose, P.C. and Kar, R.(2010) Official report, Director of Sericulture, Govt. of Assam, Memo. No SDT/79/2000/89-A

2. Karlen, D.L., Mausbach, M.J., Doran, J.W., Cline, R.G., Harris, R.F. and Schuman, G.E. (1997) Soil quality: a concept, definition, and framework for evaluation: (a guest editorial), *Soil Science Society of America Journal*, **61**(1) 4–10,

3. Arshad, M.A. and Martin, S. (2002) Identifying critical limits for soil quality indicators in agro-ecosystems, *Agriculture, Ecosystems and Environment*, **88** (2) 153–160

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7. Urkurkar, J.S., Tiwari, A., Chitale, S. and Bajpai, R.K (2010) Influence of long-term use of inorganic and organic manures on soil fertility and sustainable productivity of rice (*Oryza sativa*) and wheat (*Triticum aestivum*) in Inceptisols, *Indian Journal of Agricultural Sciences*, **80** (3) 208–212

8. Barua P.K. and Bora,P.K. (1975) Fertility status of the soils of North Eastern region, *Journal of the North Eastern Council,***1**(2) 21–26.

9. Statistical Hand Book of Assam, (2009) Directorate of Economics and Statistics, Government of Assam, Guwahati, India.

10. Yadav, M.P., Mohd, A. and Kushwaha, S.P. (2005) Effect of integrated nutrient management on rice (*Oryza sativa*)-wheat (*Triticum aestivum*) cropping system in central plains zone of Uttar Pradesh, *Indian Journal of Agronomy*, **50** (2) 89–93

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12. Singh, S.R., Zargar, M.Y., Singh, U. and Ishaq, M. (2010) Influence of bio-inoculants and inorganic fertilizers on yield, nutrient balance, microbial dynamics and quality of strawberry (*Fragariaxananassa*) under rainfed conditions of Kashmir valley, *Indian Journal of Agricultural Sciences,***80** (4) pp. 275–281.

13. Bowman, R.A., Vigil, M.F., Nielsen, D.C. and Anderson, R.L. (1999) Soil organic matter changes in intensively cropped dry land systems, *Soil Science Society of America Journal***63** (1) 186–191

14. Palm, C., Sanchez, P., Ahamed, S. and Awiti, A. (2007) Soils: a contemporary perspective, *Annual Review of Environment and Resources*, **32**: 99–129.

PART VII: BIODATA OF PROJECT C00RDINATOR/PRINCIPAL INVESTIGATOR/ COINVESTIGATORS

1. PRINCIPAL INVESTIGATOR:

1.	Full name	Dr. SUMENDRA NATH GOGOI
2.	Designation	Scientist-D
3.	Department/Institute/University	Moriculture Division
4.	Address for communication	Regional Sericultural Research Station, Central Silk Board, Govt. of India; Rowriah, Jorhat, Assam, India
5.	Date of birth	01.11.1958
6.	Sex	Male

7. Education (Post graduation onwards and professional career)

Highest degree	Degree passed	University	Country	Subjects
M.Sc.	1981	Dibrugarh University	India	Life Science -Botany (Cytogentics& Plant breeding)
Ph. D.	1992	-do-	-do-	Weed Ecology

1. Awards (Not required for in-house personnel)

Year	Award	Agency	Purpose	Nature
2008	Best Scientist	CSB	Development superior Som Variety (Godadhor)	

2. Positions held/Research experience in various institutions(Not required for in-house personnel)

Employer	Designation	Date of joining	Date of leaving
CSB	SRA	06.6.1984	Nil

3. Memberships/Fellowships (Not required for in-house personnel)
4. Patents: (Not required for in-house personnel)
5. Publications (Numbers only):

   Books: 4

   Research papers, reports: 46

   General articles: 2

6. Projects submitted/being pursued/carried out by Investigator:

Sl. No.	Title of the project	Funding agency	Duration	No. of Scientists	Total cost of the project (laks)
1.	Survey collection of weed flora in mulberry plantation of Assam	CSB	1984-86	2	-
2.	Yield trial of improved mulberry varieties in different locations of Assam	CSB	1986-89	2	-
3	Evaluation of package of practices for propagation of Eri Silkworm Host plant	CSB	1986-88	2	-
4	Yield trials of improved mulberry varieties in Nagaland	CSB	1989-1991	2	-
5	PIB-4637: Qualitative and quantitative improvement of muga host plant, *Perseabombycina*Kost through polyploidy	CSB	2002-2004	3	19.62
6	National Agricultural Technological Project	ICAR	2004-2006	3	Sponsored by AAU, Jorhat,
7	PIB-5838: Selection of promising som, *Perseabombycina (*King ex. Hook f.) Kost, genotypes for improvement of muga cocoon production in NE India.	CSB	2005-2009	3	36.3
8	PIB 5848: Evaluation of superior genotyope (s) of castor (*Ricinuscommunis* L.)	CSB	2007-2010	5	13.46
9	PPS-3435: Studies on micronutrients for sustained high productivity of quality mulberry in eastern and northeastern India		2010-2013	4	-
10	All India Coordinate experimental Trials for mulberry	CSB	2011-2015	2	-
11	B-JRH9P-19: Assessment of fertility status of mulberry growing soils in selected Seri villages of Jorhat district for appropriate fertilizers management.	CSB	20011-2013	1	-
12	Studies on the biology and efficiency of the coccinellidsp for management of whitefly on mulberry	CSB	20011-2013	2	-

14. Highlights of outcome/progress of the project (s) handled during the past 10 years, their outcome and utilization (in 200 words).

PIB-4637:

- Four tetraploids som genotype (PB009, PB010, PB011, and PB012) were developed through colchicines treatment and registered in NBPGR, ICAR, New Delhi under IC number *w.e.f.* IC-556923, IC-556924, IC-556925 & IC-556926 respectively. It is first reported in som (*Perseabombycina*Kost)
- Tetraploid accession, PB011 showed maximum leaf biomass than all other genotypes.
- Tetraploid accession, PB012 showed less larval period (23 days), maximum cocoon weight (6.70 g), shell weight (0.61 g) and ERR (88%) than other tetraploid and diploids som variety.
- Accession, PB012 showed higher crude protein (12.59%), less fiber (18.33%), higher soluble sugar (6.63%) and moisture (64.40%) content than other som varieties.
- Accession, PB012 is selected as superior som variety and recommended by Research Advisory Committee (RAC) of CMER&TI held on 13-14th March 2007 for commercial exploitation.

National Agricultural Technological Project (NATP): During NATP, Field Gene Bank of Muga and Eri silkworms host plants was established at Chenijan , Jorhat, Assam. Collected genetic resources were planted into field gene bank of Germplasm Conservation Centre (GCC) under Central Muga Eri Research and Training Institute, Lahdoigarh, Jorhat, Assam as follows.

Sl No	Name of the Species	Local Name	Nos. of genetic resources
1	*Perseabombycina* (King ex Hook .f.) Kost.	Som	51
2	*Litsaea polyantha*Blume	Soalu	30
3	*Litsaeasalicifolia* Hook. F.	Digloti	16
4	*Litsaea cubeba* Pers.	Mejankari	2
5	*Litsaea nitida* Hook f.	Kathulua	2
6	*Ricinuscommunis* L.	Castor	72
7	*Heteropanexfragrans*	Kesseru	17
8	*Evodiaflaxinifolia*	Payem	2
9	*Alianthusgrandis,*	Barpat	2

PIB5838:

- Thirty nine (39) plus trees of som, *Perseabombycina*Kost. have been identified in Northeastern region of India (Assam, Nagaland, Meghalaya and Arunachal Pradesh) by comparison tree method which were collected and introduced into GPB from accession PB0013 to PB051 and registered in NBPGR, New Delhi , IC number from 73237 to IC 73275 respectively.
- Six som accessions *viz*PB-023, PB-028, PB-049, PB-029, PB-050 and PB-039 were selected as superior variety of Som for commercial exploitation and breeding programme.

PIB 5848:

- Two castor accessions *viz* AC–003, AC-004 have been selected as superior Castor variety for commercial exploitation in fields and utilization in breeding programme.

PART VII: DECLARATION/CERTIFICATION

It is certified that

a. The research work proposed in the project does not in any way duplicate the work already done or being carried out elsewhere on the subject.

b. The same project has not been submitted to any other agencies for financial support.

c. The emoluments for the manpower proposed are those admissible to persons of corresponding status status employed in the institute/university or as per the Ministry of Science & Technology guidelines (Annexure-III).

d. Necessary provision for the project will be made in the institute in anticipation of the sanction of the same.

e. If the project involves the utilization of genetically engineered organism, it is agreed that we will ensure that an application will be submitted through our institutional bio safety committee and we will declare that while conducting experiments, the bio-safety guidelines of the Department of Biotechnology would be followed *in toto.*

f. If the project involves field trials/experiments/exchange of specimens etc. We will ensure that ethical clearances would be taken from the concerned ethical committees/competent authorities and the same would be conveyed to the Department of Biotechnology before implementing the project.

g. It is agreed by us that any research outcome or intellectual property right (s) on the invention (s) arising out of the project shall be taken in accordance with the instructions issued with the approval of the Ministry of Finance, Department of Expenditure as contained in annexure-V.

h. We agree to accept the terms and conditions as enclosed in Annexure-IV. The same is signed and enclosed.

i. The institute agrees that the equipment, the basic facilities and such other administrative facilities as per terms and conditions of the grant will be extended to investigators throughout the duration of the project.

j. The institute assumes to undertake the financial and other management responsibilities of the project.

1. Signature of Project Co-Coordinator
   (Applicable for inter-institutional projects only) and date

2. Signature of Executive Authority of Institute with seal and date

3. Signature of Principal Investigator

4. Signature of Co- Investigator

5. Signature of Co-ordinator
   (Director NBSS&LUP,Nagpur)