

वार्षिक प्रतिवेदन
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**Annual Report
1992 - 93**



भारतीय लाख अनुसंधान संस्थान
Indian Lac Research Institute
(भाकृ अनुप : ICAR)
राँची, भारत : Ranchi , India

वार्षिक प्रतिवेदन 1992-93

Annual Report 1992-93



भारतीय लाख अनुसंधान संस्थान

Indian Lac Research Institute

(भारतीय कृषि अनुसंधान परिषद्)

(Indian Council of Agricultural Research)

नामकुम, राँची 834 010, भारत

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Editorial Board

Dr D. N. Goswami
Dr B. P. Singh
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Technical Assistance

Shri S. K. M. Tripathi
Shri R. Prasad
Shri R. P. Srivastava

Design and Layout

Shri R. Ramani

Typing of the Manuscript

Shri A. Pandey

Hindi Translation

Shri S. K. M. Tripathi
Shri Laxmi Kant
Shri Anjesh Kumar

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INTRODUCTION

The Indian Lac Research Institute (ILRI) was started, on the basis of recommendation of an enquiry committee constituted by the Government of India to enquire into the condition of the Indian lac trade and suggest measures for its all-round improvement. In order to implement this suggestion, members engaged in the lac trade at that time constituted themselves into a private registered body under the name, Indian Lac Association for Research. The association set up this institute in 1925. In 1931, the Indian Lac Cess Committee took over this institute. After the abolition of this committee, ILRI came under the administrative control of the Indian Council of Agricultural Research (ICAR), from April, 1966.

The Institute

The ILRI is situated in the peaceful suburbs, nine kilometers east of Ranchi, on the Ranchi - Tatanagar highway and is spread over an area of 49 ha. Located in the main campus are : the Entomology Division, Chemistry Division, Plant Sciences Section and Extension Division; the Administrative, Finance and Accounts, and Mechanical Sections; the Library; besides, the residential quarters. Adjoining this, is a small campus housing the Technology Section and the staff quarters. The institute has playgrounds in both the campuses. Adjoining the campuses there is a 36.5 ha plantation for field experimentation. The Institute also has a Regional Field Research Station for Lac at Dharamjaigarh, M.P. and runs an

Operational Research Project in a group of villages in Ranchi district. The ILRI is a pioneer organisation devoted to researches on cultivation, processing and utilization of lac, which is mostly cultivated in an area of about 80,900 sq. km. by the tribals of Bihar and adjoining states. Since its inception, the Institute has persistently endeavoured to develop and disseminate appropriate technologies to boost up lac production. A good number of products and processes have already been developed and efforts are continuing to explore newer areas in view of everchanging requirements of the industry. ILRI has attained international recognition for its contribution in cultivation and utilization aspects of lac.

Objectives

The objectives of the Institute are :

- ❑ to carry out researches towards effecting improvement in the production, processing and standardization of lac and study its constitution and modifications so as to intensify lac production and extend its utilisation;
- ❑ to extend the results of research through publicity, maintaining liaison with and providing technical service to the growers for improvement in lac production and indigenous industries towards increased utilisation of lac and improving the quality of their products; and
- ❑ to impart training in improved methods of lac cultivation and industrial uses of lac.

Organisational Set-up

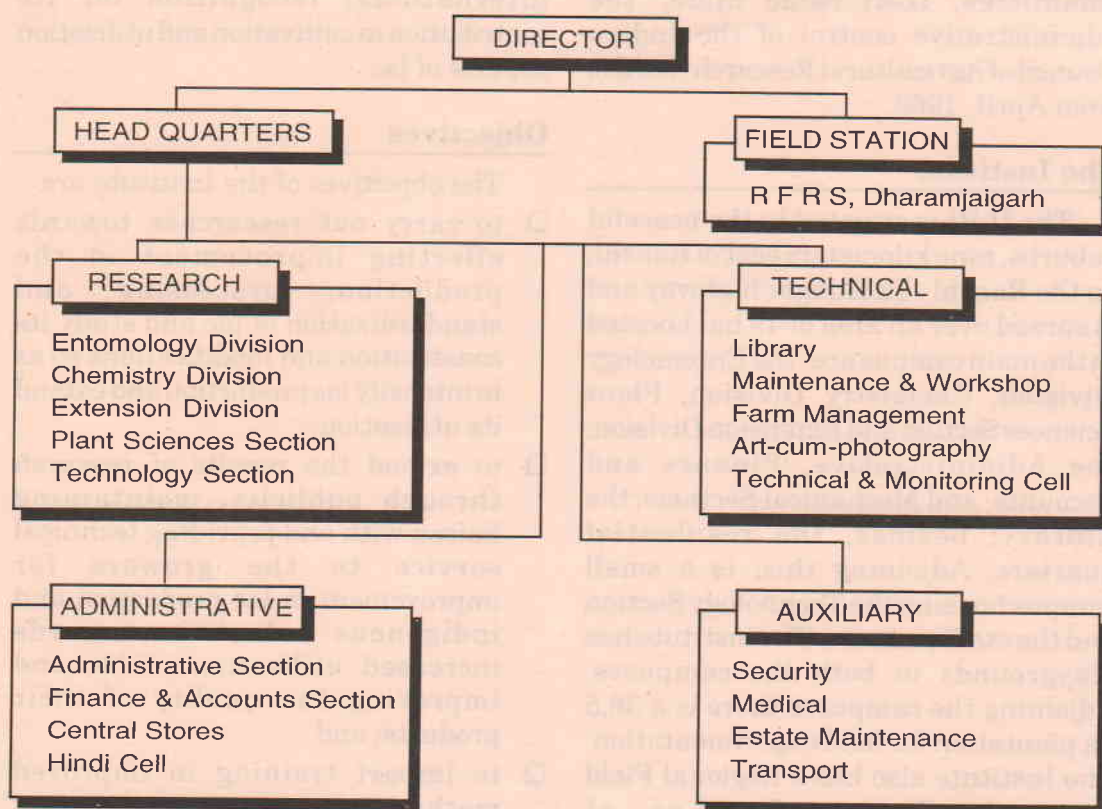
The Institute is headed by a Director. The scientific manpower is deployed under three divisions : Chemistry, Entomology and Extension, and two sections : Plant Sciences and Technology. The Administrative wing comprises of Administrative Section, Finance & Accounts Section, Hindi Cell and Central Stores. The auxiliary units are : Security, Medical and Estate Maintenance Services. The technical support is provided by the following sections : Library, Farm Unit, Maintenance &

Workshop and Technical & Monitoring Cell.

Staff and Budget

The Institute has a sanctioned strength of 61 scientific, 86 technical, 49 administrative, 14 auxiliary and 136 supporting grade posts.

During 1992-93, the non-plan expenditure was Rs 129.58 lakhs against the budget estimate of Rs 120.00 lakhs, the plan expenditure was Rs 26.62 lakhs against the budget estimate of Rs 46.00 lakhs.



Organizational set-up of ILRI

Research Highlights

Breeding of superior lac insect

A cream genetic variant secreting lighter-coloured resin has been derived from a *rangeeni* line of the Indian lac insect. This insect has provided fresh hope of developing a breed of lac insect secreting lighter-coloured resin.

Artificial rearing of lac predator

Holcocera pulverea, a major lac predator has been successfully reared on artificial diets. This is expected to be useful in laboratory studies for developing more effective control measures.

Akashmani, a fast growing lac host

Akashmani (*Acacia auriculaeformis*) showed a rapid growth, among the lac hosts raised under the experiment aimed at developing a multistoreyed system for lac cultivation.

Multilayered pesticidal system for roach control

Studies to develop a multilayered pesticidal system for cockroach control, have revealed the scope of using aleuritic acid-free gummy hydrolysed lac (a factory waste) as a matrix for the system.

Insulating varnish based on shellac-polymer blend

Dielectric properties of different blends of shellac and polyvinylacetal resin solutions revealed that both the

resins were compatible and their blend (equal proportions) can be used as air-drying type insulating varnish as it possessed good dielectric strength (68 kV/mm) and increased resistance towards tracking when tested according to IS:10026-1982.

Lac-based hot-melt adhesive

As a result of attempts made to develop lac-based hot-melt adhesive composition suitable for jointing carton and paper surfaces, a satisfactory composition based on lac and hydrolysed lac has been prepared yielding bond strength of 0.4 tons/sq.inch.

Improvement in the process of recovery of lac dye

Recovery of lac dye from wash water has been made easier by reducing one step in the process, to minimise the cost.

Extension Highlights

More than 500 persons, sponsored by different government/private organisations and entrepreneurs, were given training on cultivation, processing and utilisation of lac through different short-term and long-term training courses.

The technical guidance provided to the Forest Department, Govt. of Bihar for large scale cultivation of lac at Kundri helped them to produce about 80 quintals broodlac in October-November. Lac cultivation activities at this farm provided direct employment of 2566 mandays for local tribals and others □

PROGRESS OF RESEARCH

DIVISION OF ENTOMOLOGY

Researches in progress

1.1 Improvement in lac cultivation techniques

1.1.9 To evolve suitable management practices for brood and sticklac production in the light of recent findings

Y. D. Mishra, S.G. Choudhary and M.L. Bhagat

The project aims at (i) improving the lac crop management practices for sustained production of quality broodlac and maximising the yield of sticklac on the conventional lac hosts and (ii) developing a method for estimation of broodlac requirement and expected yield.

Techniques for kusum

During the period under report, lac crop could not be raised as per the technical programme due to shortage of broodlac. The pruning operations were carried out as outlined in **Table 1**.

Table 1 Details of the seasonal operations, on kusum, conducted in the field area at Hesal

Treatment	Coupe	Period	Operation
KA, KB, KC, KD & KE	III	July, 1992	Pruning
	IV	July, 1992	Crop inoculation could not be done due to broodlac shortage
	IV	Feb, 1993	Pruning
	I	Feb, 1993	Crop inoculation could not be done
KH	II	July, 1992	Pruning

1.1.10 Evolution of cultivation schedule on *Akashmani* (*Acacia auriculaeformis*) for growing kusmi and rangeeni crops

S.G. Choudhary, A.H. Naqvi and A.K. Sen

Field trials were conducted as per the technical programme (*Ann. Rep. 1990-92*). The following experiments were repeated during the period under report.

Pruning time and technique

For determining the pruning time and technique, the common methods of pruning i.e., apical and basal were tried during different months. The total number of buds and shoots appearing after pruning were scored. The total length of shoots were also measured.

It was found that *akashmani* responded well to both the common methods of pruning and the maximum inoculable area was obtained from the plants pruned in July and February followed by October.

Optimum brood rate and age of shoot

Lac crop yields during the *katki* 1992 season on *akashmani*, under different brood rates on different age of shoots were determined, and are given in **Table 2**. In this experiment, biological parameters of lac crop were also recorded during the *katki* 1992 and the *baisakhi* 1992-93 seasons. Work on *kusmi* insect could not be taken up due to nonavailability of broodlac. The yield

ratio was high at brood rates ranging between 10 and 20g/m on 18-month-old shoots (Table 2).

Alternation of broodlac

The *katki* 1992 was raised using brood from *palas* and *ber* on 20

akashmani plants (ten trees each for brood lacs of *palas* and *ber*). Similarly, lac crops were also raised on *palas* and *ber* using *akashmani* broodlac during the same season. Biological parameters of the lac crop and industrial parameters of the lac derived from these hosts were studied.

Table 2 Effect of age of shoots and brood rate on *katki* 1992 lac yields on *akashmani*

Brood rate (g/m)	Age of shoots (month)	Brood used (g)		Yield obtained (g)			Brood used : yield ratio	
		Brood lac sticks	Scraped lac	Brood lac sticks	Rejected lac sticks	Total scraped lac	Brood to brood	Brood (scraped lac) to total scraped lac
		1	2	3	4	5	1:3	2:5
10	12	400	100	1200	600	350	1:3.0	1:3.5
15		600	125	1750	600	460	1:2.9	1:3.7
20		800	150	2250	500	530	1:2.8	1:3.5
25		1000	200	2000	750	490	1:2.0	1:2.4
30		1200	250	2500	900	650	1:2.1	1:2.6
10	18	400	100	2000	450	500	1:5.0	1:5.0
15		600	125	2850	500	700	1:4.7	1:5.6
20		800	160	3275	400	780	1:4.1	1:4.9
25		1000	210	3050	700	760	1:3.0	1:3.6
30		1200	250	4250	600	960	1:3.5	1:3.8
10	24	400	100	1250	500	330	1:3.1	1:3.3
15		600	130	1830	500	425	1:3.0	1:3.3
20		800	160	2560	400	530	1:3.2	1:3.3
25		1000	200	2030	1300	500	1:2.0	1:2.5
30		1200	250	2330	1000	600	1:1.9	1:2.4

Alternation of broodlac from *palas* and *ber* to *akashmani* and *vice versa* was found to be successful with respect to lac yield as well as biological and industrial parameters. The colour and flow of the lac derived from *rangeeni* crops on *akashmani* were found to be superior compared to those of lac derived from the conventional hosts.

1.2 Physiology of lac insects and associated insects

1.2.5 Analysis of physico-physiological factors causing lac insect preference for host plants

A.H. Naqvi

Studies were continued on the effect of soil application of N, P and K to *bhalia* (*Flemingia macrophylla*) and *galwang* (*Albizia lucida*) plants, on some biological attributes of lac insects (no. of larvae settled/2.5 cm shoot length; mortality after settlement; proportion of males and sticklac yield/bush) cultured on them, as per technical programme (*Ann. Rep. 1988*). The results of the experiments conducted using *bhalia* and *galwang* have been summarised in **Tables 3** and **4** respectively.

Experiment on *bhalia*

Baisakhi 1991 - 92 : The crop had been inoculated in Oct. 1991 and the report on density of larval settlement, initial mortality as well as proportion of males have been reported in *Ann. Rep. 1990-92*. The crop was harvested in July 1992 and the maximum lac yield was 60g/plant in N and 40g in control.

Jethwi 1992 : The crop inoculation was made in Feb. 1992. The maximum settlement of lac larvae was in N+P+K (300) and minimum in K (120). The initial larval mortality was highest in control (42.85%) and lowest in P+K and K (25%). Highest proportion of males was found in N+K (32%) and the lowest in K (16.66%). The crop suffered total mortality towards maturity.

Katki 1992 : The crop was inoculated in July 1992 and the maximum larval settlement was found in N+P (810) and minimum in K (350). The initial larval mortality was highest in N+P (39.5%) and lowest in K (22.85%). The male proportion was highest in K (31.42%) and lowest in N+P (22.22%). The maximum lac yield was in N+P (47g) and minimum in P (4.2g).

Baisakhi 1992-93 : The crop was inoculated in Oct. 1992 and the data collected revealed that the maximum larval settlement was in N+K (600) and minimum in N+P (320). The initial mortality of lac larvae was highest in P (37.03%) and lowest in K (11.77%). The proportion of males was highest in control (45%) and lowest in P+K (21.27%). The crop was in progress.

Experiment on *galwang*

Jethwi 1992 : The crop was inoculated in Feb. 1992 and the maximum lac larval settlement was found in N+P+K and K (320) and minimum in N+K (180). The initial larval mortality was highest in N (41.17%) and lowest in N+P (20%). The proportion of males was highest in N+P (30%) and lowest in N (19.6%). No yield, however, could be obtained due to high mortality of lac insects after sexual maturity stage.

Katki 1992 : The crop was inoculated in July 1992. The maximum settlement of lac larvae was in N+K (750) and minimum in N(430). The initial larval mortality was highest in N+K (41.33%) and lowest in P+K (14.81%). The proportion of males was highest in P+K (33.33%) and lowest in N+P+K (20%). The crop was harvested in Nov. 1992 and the maximum yield of 300g was in K

and minimum of 30g in N+K.

Baisakhi 1992-93 : The crop was inoculated in October'92. The maximum larval settlement was in P+K (560) and minimum in N (340). The initial larval mortality was highest in N (33.82%) and lowest in N+P(14%). The male proportion was highest in P+K (30.35%) and lowest in N (22%). The crop is in progress.

Table 3 Effect of soil application of N, P and K to *bhalia* bushes on lac insect attributes, during various crop seasons

Crop Season	N	P	K	N+P	N+K	P+K	N+P+K	Control
No. of larvae settled/2.5 cm shoot length								
<i>Baisakhi</i> 1991 - 92	640	545	580	195	720	553	640	406
<i>Jethwi</i> 1992	260	200	120	180	250	200	300	280
<i>Katki</i> 1992	600	440	350	810	500	500	480	480
<i>Baisakhi</i> 1992 - 93	560	540	450	320	600	470	340	450
Mortality after settlement (%)								
<i>Baisakhi</i> 1991 - 92	35.80	40.20	26.30	46.30	28.60	38.30	42.00	31.80
<i>Jethwi</i> 1992	38.46	32.50	25.00	36.11	28.00	25.00	40.00	42.85
<i>Katki</i> 1992	35.00	36.36	22.85	39.50	28.00	30.00	27.00	33.33
<i>Baisakhi</i> 1992 - 93	23.21	37.03	11.77	25.00	16.66	29.78	36.76	22.22
Percentage of males								
<i>Baisakhi</i> 1991 - 92	29.32	29.00	26.54	27.41	34.23	33.35	33.22	35.00
<i>Jethwi</i> 1992	23.07	22.50	16.66	25.00	32.00	20.00	20.00	21.42
<i>Katki</i> 1992	23.33	27.27	31.42	22.22	28.00	26.00	31.25	31.25
<i>Baisakhi</i> 1992 - 93	26.78	25.92	28.88	28.12	30.00	21.27	29.41	45.00
Sticklac yield/bush (g)								
<i>Baisakhi</i> 1991 - 92	60.0	12.5	-	30.0	48.0	28.0	25.0	40.0
<i>Katki</i> 1992	21.2	4.2	30.0	47.0	9.4	6.0	20.0	14.0

Table 4 Effect of soil application of N, P and K to *galwang* bushes on lac insect attributes, during various crop seasons

Crop Season	N	P	K	N+P	N+K	P+K	N+P+K	Control
No. of larvae settled/2.5 cm shoot length								
<i>Jethwi</i> 1992	255	280	320	200	180	275	320	300
<i>Katki</i> 1992	430	490	520	680	750	540	600	720
<i>Baisakhi</i> 1992 - 93	340	470	500	500	480	560	400	420
Mortality after settlement (%)								
<i>Jethwi</i> 1992	41.17	34.54	28.57	20.00	33.33	26.66	40.62	20.80
<i>Katki</i> 1992	39.53	20.40	23.00	41.17	41.33	14.81	30.00	32.00
<i>Baisakhi</i> 1992 - 93	33.82	23.40	30.00	14.00	22.91	23.92	30.00	28.57
Percentage of males								
<i>Jethwi</i> 1992	19.60	21.81	21.42	30.00	27.77	23.33	21.87	20.00
<i>Katki</i> 1992	32.55	22.65	26.92	22.00	24.00	33.33	20.00	23.61
<i>Baisakhi</i> 1992 - 93	22.00	26.17	30.00	30.00	25.00	30.35	27.50	28.57
Sticklac yield/bush (g)								
<i>Katki</i> 1992	90	90	300	50	30	200	40	70

1.4 Control of enemies of lac insect

1.4.17 Survey of pathogenic microorganisms and their effect on the development of lac insect

A.H. Naqvi, A. Bhattacharya, S.G. Choudhary
and A.K. Sen

This project was restarted during the year with certain modifications in the layout of the experiment, primarily

involving survey, preservation and identification of disease causing microorganisms in the lac insect during crop seasons, and ascertaining the quantum of damage caused to the lac insect and the crop.

The *baisakhi* 1992-93 crop was raised on 200 unpruned bushes of *bhalia*. Although the crop did not survive after April '93, samples examined at fortnightly intervals did not reveal the mortality of lac insect due to microbial disease.

1.4.18 Field trials of chitin inhibitors in combination with other pesticides for the control of major lac predators

A. Bhattacharya

Effect of formulated plant-origin insecticides on the eggs of Eublemma amabilis

The experiment was conducted in the laboratory for evaluating the formulated plant - origin insecticides, namely, R.D. - 9 Repelin, Neemguard and Neemark, against the eggs of *E. amabilis* of various ages. Adults of *E. amabilis* were made to lay eggs on paper strips under laboratory conditions. Eggs of the various age groups viz., 0-24,

24-48, 48-72, 72-96, 96-120 and 120-144 h along with the paper strips were dipped in the various emulsions of the above mentioned insecticides for one minute, air-dried and kept for hatching in glass petri dishes. The control eggs were dipped in water. The hatching of the larvae from treated eggs were recorded. The experiment consisted of seven treatments with three replications.

The results are given in **Table 5**. All the insecticides significantly affected the hatching of *E. amabilis* eggs of all ages. Application of these insecticides also resulted in shrinking of the eggs, mortality of the embryos and failure of embryos to hatch out.

Table 5 Effect of formulated plant origin insecticides on the hatching of *Eublemma amabilis* eggs

Treatment	Average percent hatching of Eublemma eggs [#]					
	Age of eggs (h)					
	0-24	24-48	48-72	92-96	96-120	120-144
R.D.-9 Repelin (1%)	47.75 (54.66)	61.22 (76.66)	52.72 (63.33)	51.75 (61.66)	62.22 (77.77)	65.31 (82.21)
R.D.-9 Repelin (2%)	58.09 (72.00)	54.78 (66.66)	40.98 (43.33)	44.97 (50.00)	37.72 (37.77)	62.28 (76.66)
Neemguard (3%)	65.53 (82.66)	66.14 (83.33)	41.72 (44.44)	61.76 (76.66)	70.77 (84.44)	55.64 (67.77)
Neemguard (5%)	67.63 (85.33)	52.77 (63.33)	39.83 (41.11)	42.59 (46.66)	63.62 (79.99)	48.23 (55.55)
Neemark (3%)	59.01 (73.33)	35.21 (33.33)	64.38 (79.99)	63.55 (80.00)	37.77 (37.77)	63.97 (78.88)
Neemark (5%)	58.09 (72.00)	45.00 (50.00)	62.13 (77.77)	41.73 (45.00)	48.21 (55.55)	48.15 (55.55)
Control	90.00 (100.00)	90.00 (100.00)	86.45 (98.88)	90.00 (100.00)	90.00 (100.00)	90.00 (100.00)
S.Em.±	4.53	3.16	7.06	8.14	8.49	7.21
C.D. at 5%	9.87	6.90	15.40	17.74	18.51	15.71
C.D. at 1%	13.83	9.67	21.59	24.88	25.96	22.03

[#]Values are arc sin $\sqrt{\text{percentage}}$; original values are within parentheses

Effect of formulated plant-origin insecticides on the predators of lac insect

The *katki* 1992 lac crop was raised on *bhalia* bushes and sprayed with the insecticides a week after *phunki* removal. Post treatment samples were drawn for recording the predator populations. The experiment consisted of seven treatments with three replications.

There was no significant difference in the per metre predator population under various treatments when compared with the control.

Effect of individual and combination sprays of formulated plant-origin

insecticides and the chitin inhibitor (diflubenzuron) on the predator of lac insect

The *aghani* 1992-93 crop was raised on *bhalia* bushes and sprayed with the insecticides after *phunki* removal. Post-treatment observations were taken and the predator populations were recorded. The experiment consisted of eight treatments and three replications. The data are presented in **Table 6**.

Diflubenzuron (0.05%) alone and in combination with Neemark (5%) or Neemguard (5%) resulted in a highly significant control of the lac predators in the field.

Table 6 Effect of combination spray of formulated plant-origin insecticides and chitin inhibitor on the predator population during the *aghani* 1992-93 crop season

Treatment (conc.)	Mean predator population per metre of lac encrustation
Diflubenzuron (0.05%)	3.09 (10.80)
R.D. 9 (2%)	4.39 (19.74)
Neemark (5%)	4.04 (16.33)
Neemguard (5%)	5.39 (28.68)
Diflubenzuron (0.05%)+R.D.9 Repelin (2%)	3.77 (13.34)
Diflubenzuron (0.05%)+Neemark (5%)	1.36 (0.93)
Diflubenzuron (0.05%)+Neemguard (5%)	1.97 (3.65)
Control	6.24 (38.17)
S. Em. \pm	0.88
C.D. at 5%	1.89
C.D. at 1%	2.62

The values are arc sin $\sqrt{\text{percentages}}$; original values are within parentheses

1.4.19 Fortification of pest management for the control of enemies of lac insect

S. G. Choudhary

Field trial were repeated at Kundri orchard as per the technical programme outlined below :

The experiment was in an RBD with a two-coupe system comprising of sixteen treatments, with 15 *palas* trees under each treatment replicated thrice.

Treatment t_1 : (Recommended integrated control schedule in practice) Crop inoculation on 2/3 of the trees at normal brood rate i.e., 10-15 g/m, using brood enclosed in 60-mesh synthetic netting; heavy inoculation of the remaining 1/3 of the trees for trap cropping; and spraying of Thiodan at 0.05% concentration on the trees inoculated at normal brood rate.

Treatment t_2 : Crop inoculation with brood, treated with Thiodan (by dipping in a 0.05% solution for 5-10 min.), at normal rate.

Treatment t_3 : Spraying of BHC, at 0.05 % concentration, by the end of March/ early April and again during the first fortnight of August, on trees inoculated at normal brood rate.

Treatment t_4 : Spraying of Thiodan

+ BHC at 0.05 % each, during August and September.

Treatment t_5 : (Control) Crop inoculation at normal brood rate but without any further treatment.

Further treatments, after integration of the above, were as follows : t_1t_2 , t_1t_3 , t_1t_4 , t_2t_3 , t_2t_4 , t_3t_4 , $t_1t_2t_3$, $t_1t_2t_4$, $t_1t_3t_4$, $t_2t_3t_4$, $t_1t_2t_3t_4$. There were thus 16 treatments in all.

Pruning of the experimental trees was done in April. Lac samples were also collected periodically for assessing pest population. The *baisakhi-cum-katki* 1991 - 92 crop was harvested in Oct. and the lac yield data collected. Lac samples (one kg lac sticks/treatment) were also caged for recording the number of pests emerging therefrom. The results have been presented in **Table 7**.

Introduction of BHC in the existing integrated control schedule was effective in improving lac yields. Dipping of broodlac in Thiodan before inoculation was also effective in suppressing the pests resulting in increased yields. There was 28.8 to 66.08 % reduction of total pest population (Table 7). The per cent increase in lac yields over control varied from 46.1 to 142.5% The highest increase in yield was in treatment t_1t_4 (142.5%) followed by $t_1t_2t_3$ (134.7%).

Table 7 Effect of various treatments of pest control on the lac yields and pest population during the *baisakhi-cum-katki* 1991-92 crop season

Treatment	Brood used per tree(g)		Yield obtained per tree (g)			Increase in yield over control (%)	Pest population density (No./100g)	Reduction in pest population (%)
	Brood lac sticks	Scraped lac	Brood lac sticks	Rejected lac sticks	Total scraped lac			
t ₁	200	40	1990	1370	765.9	86.3	7.6	33.9
t ₂	200	42	1660	1330	676.0	64.4	5.4	53.0
t ₃	210	40	2370	1330	927.5	125.6	5.9	48.6
t ₄	210	46	2150	1710	916.4	122.9	5.2	54.7
t ₅	210	44	1160	960	411.0	-	11.5	-
t ₁ t ₂	200	40	1980	1650	882.9	114.8	7.4	35.6
t ₁ t ₃	210	46	1300	1230	636.2	54.7	6.0	47.8
t ₁ t ₄	210	40	2470	1310	996.7	142.5	5.7	50.4
t ₂ t ₃	210	45	1580	1080	698.5	69.9	7.1	38.2
t ₂ t ₄	210	40	1850	1270	704.2	71.3	5.5	52.1
t ₃ t ₄	210	40	1640	1400	790.4	92.3	7.7	33.0
t ₁ t ₂ t ₃	210	43	2060	1530	964.8	134.7	7.4	35.6
t ₁ t ₃ t ₄	210	42	2400	1260	885.7	115.5	7.0	39.1
t ₁ t ₂ t ₄	200	40	1710	950	600.7	46.1	6.3	45.2
t ₂ t ₃ t ₄	210	40	1980	1350	832.5	102.7	9.1	20.8
t ₁ t ₂ t ₃ t ₄	210	43	2070	1610	931.0	126.5	3.9	66.0

1.5 Genetics and breeding of lac insects

1.5.8 Studies on germplasm collection, conservation and characterisation of indigenous/exotic lac insects

S. K. Jaipuria and S. K. Saha

A total of eight germplasm stocks of lac insects, which included four each of *rangeeni* and *kusmi* were maintained. They were :

Rangeeni

Local yellow (Ranchi, Bihar)
Kundri (Palamau, Bihar)
Turhamu (Palamau, Bihar)
Chopa (Bhandara, Maharashtra)

Kusmi

Orissa yellow (Orissa)
Orissa crimson (Orissa)
Madanpur (M.P.)
Namkum, (Ranchi, Bihar)

The stock collected recently from Chopa was under study. This stock appeared to be inferior with respect to resin qualities compared to other *rangeeni* stocks while biological attributes such as fecundity and resin yield were comparable.

1.5.13 Breeding superior lac insects for the colour, thermal resistance and productivity of lac resin

R. Ramani

Advanced generations of the segregating progenies of the three crossbred lines reported earlier (*Ann. Rep. 1990-92*) were selected for regular *rangeeni*- and *kusmi*-type life periods. The life periods of the F_6 generations of the reciprocal crosses of *Kundri rangeeni* crimson and Ramgarh *kusmi* crimson were highly variable, ranging from about four to nine months during the rainy season. The number of insects showing *kusmi*-type life period was, however, distinctly less.

A new cream genetic variant producing lighter coloured lac was reported earlier (*Ann. Rep. 1990-92*). A cross was made between the local yellow females and the cream males during the *baisakhi* 1991-92 crop season. All the F_1 progeny of this cross, raised during the *katki* 1992 season, showed wild phenotype (crimson body colour and normal resin colour). The F_2 generation (*baisakhi* 1992-93) segregated into wild-type and yellow insects. The scoring for colour was done just before the sexual maturity. The ratio of the wild-type and the yellow insects was approximately 1:1 in both the sexes. The deviation from the above ratio was not significant in the case of females but it was slightly significant ($p < 0.5$) in the case of males. This is probably due to the differential mortality of these insects before sexual maturity. These results indicate that the gene for cream phenotype is recessive to the allele for wild phenotype and non-allelic to the *yellow* gene.

Reciprocal crosses were also made between the wild-type *Kundri rangeeni* lac insects and the new cream variant during the *baisakhi* 1992-93 season.

Cultures of *Kundri rangeeni* stock of lac insect and an inbred line derived from it were raised for the study of lac productivity during the *katki* 1992 season. Fully mature females were collected for evaluation. The family lines of the lac insect population selected for higher thermal resistance of the lac are being maintained.

Ad hoc studies

Attraction of some insects associated with lac towards various coloured lights

A. Bhattacharya, Y. D. Mishra, A. H. Naqvi and
A. K. Sen

A laboratory experiment was conducted, to study the attraction of lac associated insects towards various colours, using glass tubes covered with cellophane papers of blue, yellow and red colours. Plain glass tubes filter served as control. The collecting tubes were then fitted randomly in the wooden parasite cage boxes (20x20x30 cm) consisting of four holes and the set-up was replicated eight times. Broodlac obtained from *katki* 1992 crop from Turhamu Farm (Chandwa) was kept in the boxes and exposed to natural light. Insects were collected from the tubes, identified and counted daily for five weeks when the emergence ceased.

The results obtained are presented in **Table 8**. Differences for the attraction of the insects emerging from brood lac was found among the colours tried. The degree of attraction towards natural light appeared to be maximum in general.

Table 8 Attraction of various insect species associated with lac insect towards different colours of light

Insect species	Mean percent attraction				S.Em.±	C.D. at 5%	C.D. at 1%
	Colour of collecting tube						
	Blue	Yellow	Red	Colourless			
<i>Eublemma amabilis</i>	15.85 (23.08)	17.27 (23.90)	19.96 (26.24)	27.69 (31.28)	-	N.S.	N.S.
<i>Holcocera pulverea</i>	12.77 (20.57)	19.77 (25.75)	23.13 (28.27)	40.39 (39.35)	3.39	7.05	9.59
<i>Bracon greeni</i>	4.58 (10.81)	36.96 (35.61)	11.05 (17.76)	47.38 (42.97)	8.61	17.90	24.36
<i>Pristomerus sulci</i>	6.38 (13.58)	26.35 (29.30)	24.39 (28.76)	42.85 (40.09)	7.14	14.85	20.20
<i>Apanteles tachardiae</i>	12.11 (18.85)	24.90 (28.67)	24.23 (28.00)	38.73 (37.79)	-	N.S.	N.S.
<i>Tetrastichus purpureus</i>	15.73 (23.20)	27.88 (31.61)	18.16 (25.14)	38.20 (38.08)	2.24	4.65	6.33
<i>Parachthrodryinus clavicornis</i>	14.63 (21.77)	31.95 (34.29)	19.08 (25.70)	32.55 (34.55)	3.59	7.46	10.15
<i>Tachardiaephagus tachardiae</i>	20.26 (26.84)	29.41 (32.81)	20.89 (26.96)	30.46 (33.36)	1.88	3.91	5.32

#Values are arc sin $\sqrt{\text{percentage}}$; original values are within parentheses

Rearing of the lac predator *Holcocera pulverea* on artificial diets in the laboratory

A. Bhattacharya, A. H. Naqvi, A. K. Sen and
Y. D. Mishra

In an attempt to rear the predator *Holcocera pulverea* on artificial diets in the laboratory, an experiment was conducted.

Adult moths of both sexes of

H. pulverea were collected from caged broodlac and confined in glass battery jars for egg laying. The glass jars were darkened by covering with black paper. Coarse sand and flint papers (5x5 cm) were kept in the jars as substrate for egg laying. Sugar solution soaked in cotton served as food. The sand and flint paper strips were changed periodically and dead moths removed. The eggs thus collected were allowed to hatch.

The larvae were then transferred on to the different artificial foods fomulations kept in glass petri dishes in powder form. The artificial foods tried were : Cerelac(an instant milk cereal for babies) and Threptin biscuits (high caloric protein supplement).

It was observed that the larvae fed and developed on both the diets. The larvae moulted 5 to 7 times before pupation. It was observed that the larvae

formed galleries in the diet and moved within them. The head capsules were collected after the various moultings and measured under microscope.

The approximate size of the larvae at various instars, duration of various instars, pupal duration and size of pupae have been shown in **Table 9**. All the eight first instar larvae reared on these diets developed into adults, which included both sexes.

Table 9 Duration and size of the larval and pupal stages of *Holcocera pulvereae* reared in artificial diets

Diet	No. of larvae	Range of approximate length of larvae in mm (Mean duration of the stage, in days)							
		I	II	Larval instar		V	VI	VII	Pupal stage
				III	IV				
Cerelac	6	2.0-3.0 (6.5)	3.0-4.0 (6.2)	4.5-6.0 (7.0)	6.5-9.0 (6.8)	10.0-12.0 (6.8)	-	-	5-6 (12.3)
Threptin	2	2.0-3.0 (7.5)	3.0-4.0 (7.0)	4.0-4.5 (9.0)	5.0-6.0 (8.5)	7.5-8.0 (10.0)	10.0-12.0 (27.5)	11.0-12.0 (24.07)	5 (16.5)

SECTION OF PLANT SCIENCES

Researches in Progress

2.1 Propagation and management of lac host plants

2.1.9 Standardization of agroforestry practices for raising high-yielding *kusum* through air-layering

S. C. Srivastava & P. Kumar

The experiment on air-layering of *kusum* was repeated in June 1992, with branches of more than 2.54 cm diameter and 1 metre length using *Sphagnum* moss and lanolin paste as rooting medium alongwith different concentrations of various hormones. The hormones tried were indoleacetic acid (IAA), indolebutyric acid (IBA), naphthaleneacetic acid (NAA) and indolepropionic acid (IPA). The hormones were applied at 50/100 ppm concentration either individually or in combination as shown in Table 10. Nine air-layers were prepared under each treatment. Cent percent rooting was observed in each of the hormonal treatments, with IAA (100ppm), IBA (100ppm), NAA (50ppm), IAA + NAA (100ppm), IBA + NAA (100ppm) and IBA + IPA (50ppm). The air-layers were detached from parent plant after good rooting was observed and transplanted in field conditions on raised soil bed (46 cm high and 122 cm diameter) for further growth and survival of air-layers.

Regular irrigation in summer was provided. However, these rooted air-layers showed heavy mortality during

the period under report. The maximum survival of rooted air-layers was 66.6% under treatment, IAA + NAA (50ppm) followed by IPA (50ppm) and (100ppm) (Table 10). Forty per cent of the air-layers prepared in June 1991, under the treatment IAA + NAA (50ppm) had also survived upto Mar. 1993, the plants derived from other treatments, however, suffered heavy mortality.

2.1.11 Scheduling of lac cultivation under multistoreyed system

B. P. Singh

The experiment was continued as per the technical programme, under rainfed condition. Observation on plant growth attributes of different lac hosts raised under the system and their percentage of increase over the previous year has been shown in Table 11. Amongst the tried hosts, the increase in plant height and plant girth was observed maximum in *akashmani* (*A. auriculiformis*) followed by *galwang* (*A. lucida*). In the third year of planting, the percentage of increase in the above characters over previous year were more in *kusum* (*Schleichera oleosa*) except in the treatment, *kusum* + *khair* + intercrop (Table 11). Few *bhalia* (*F. macrophylla*) and *akashmani* bushes were inoculated during July 1992 for raising *aghani* 1992-93 crop. The crop was not satisfactory mainly because of poor emergence and settlement of lac larvae. *Bhalia* bushes were coppiced in February 1993 for raising *aghani* 1993-94 lac crop. Attack of insect pest, viz., *Tessarotama javanica*

Thumb. was noticed on *kusum* during the summer. However, it was controlled by spraying of the Diomethoate (35 EC, 0.05%). To minimize the cost of plantation establishment and to maximise biomass production per unit area of land, upland paddy (Gora) was taken in the spaces between the lac

hosts. However, scanty rainfall during the critical period of the crop growth affected the yield and yield attributes and consequently sub-normal yield of paddy was obtained. Growing of intercrops in between the lac hosts had no adverse effect on plant growth.

Table 10 Growth attributes of air-layers of *kusum* prepared during June 1992

Hormone (ppm)	Rooted air-layers (%)	Length of shoot (cm)	Basal diameter (cm)	Length of primary roots (cm)	Av. no. of primary roots	Length of sec. roots (cm)	Survival of rooted air-layers upto March '93
IAA (50)	44.4	145.0	2.4	9.4	9.3	1.5	-
IAA (100)	100	137.2	2.5	13.4	8.6	3.7	11.1
IBA (50)	88.9	164.4	2.7	6.1	6.2	2.2	25.0
IBA (100)	100	119.4	2.5	11.0	4.0	5.0	11.1
NAA (50)	100	150.0	2.5	11.2	10.4	2.3	33.3
NAA (100)	77.8	132.2	2.3	12.2	12.4	3.4	-
IPA (50)	77.8	121.1	2.7	10.8	13.0	3.1	57.1
IPA (100)	77.8	127.8	2.5	12.2	12.3	2.5	57.1
IAA+IBA (50)	33.3	150.5	2.6	9.9	9.9	3.7	-
IAA+IBA (100)	44.4	156.7	2.6	8.8	11.1	3.3	25.0
IAA+NAA (50)	33.3	125.0	1.9	11.1	11.6	3.1	66.6
IAA+NAA (100)	100	140.0	2.4	4.6	11.1	3.9	-
IBA+NAA (50)	77.8	136.6	2.6	12.0	10.3	3.6	14.3
IBA+NAA (100)	100	163.3	2.7	11.0	4.2	2.0	22.2
IAA+IPA (50)	55.6	150.0	2.6	10.2	10.1	2.4	20.0
IAA+IPA (100)	33.3	150.5	2.5	11.4	12.2	2.2	-
IBA+IPA (50)	100	172.2	2.5	11.9	9.8	2.7	22.2
IBA+IPA (100)	44.4	121.6	2.8	10.5	4.5	0.4	50.0
IPA+NAA (50)	33.3	135.0	2.6	10.4	3.6	2.5	-
IPA+NAA (100)	55.5	119.7	2.3	10.3	12.8	3.0	-
Control	44.4	143.9	2.7	10.8	9.9	2.7	25.0

Table 11 Growth parameters of different lac hosts raised under various treatments

Treatment	Plant species	Plant height (cm)	Increase over previous year in plant height (%)	Plant girth at 10 cm above the ground level (cm)	Increase over previous year in plant girth (%)
<i>Kusum</i>	<i>Kusum</i>	66.10	65.79	5.75	89.14
<i>Kusum</i> + Intercrop	<i>Kusum</i>	60.83	60.63	4.65	83.79
<i>Kusum</i> + <i>Akashmani</i> + Intercrop	<i>Kusum</i>	89.33	78.66	6.44	105.75
	<i>Akashmani</i>	450.00	64.59	27.66	54.70
<i>Kusum</i> + <i>Ber</i> +Intercrop	<i>Kusum</i>	63.40	66.62	3.97	74.12
	<i>Ber</i>	165.70	38.54	7.07	73.71
<i>Kusum</i> + <i>Bhalia</i> +Intercrop	<i>Kusum</i>	65.90	78.35	5.66	124.28
	<i>Bhalia</i>	133.00	4.09	3.54	2.91
<i>Kusum</i> + <i>Galwang</i> +Intercrop	<i>Kusum</i>	68.56	64.73	6.19	123.46
	<i>Galwang</i>	241.00	25.81	16.44	39.20
<i>Kusum</i> + <i>Khair</i> +Intercrop	<i>Kusum</i>	52.06	52.43	3.52	41.36
	<i>Khair</i>	150.00	55.36	8.45	72.80
<i>Kusum</i> + <i>Bhalia</i> + <i>Galwang</i> + Intercrop	<i>Kusum</i>	65.73	59.73	4.90	49.31
	<i>Bhalia</i>	149.30	2.08	3.70	2.21
	<i>Galwang</i>	184.25	22.28	14.71	44.21



Larvae of *Holcocera pulverea* feeding on artificial diet



Experimental plot of *kusrunt* (*Flemingia strobilifera*) bushes

2.1.12 Management of *kusrunt* (*Flemingia strobilifera*) for lac cultivation

P. Kumar, B. P. Singh & S. C. Srivastava

Effect of height of coppicing and N,P fertilizers on plant growth and lac yield

An experiment was laid out in a split-plot design, having 18 treatments with three replications, with the objective to study the effect of height of coppicing at 10 and 15 cm above ground level (main plot treatments) and NP fertilizers alone and in combinations each at 20 kg or 40 kg/ha (sub. plot treatments) on growth of plants and yield of lac. All the raised plants have established satisfactorily and are proposed to be inoculated in June-July 1993 for raising *aghani* 1993-94 lac crop.

2.2 Genetics and breeding of lac host plants

2.2.6 Survey of genetic variation in lac potential of host plants

S. C. Srivastava, Y. D. Mishra & P. Kumar

The *aghani* 1992-93 lac crop was harvested from *F. macrophylla* which was grown earlier through vegetative propagation of 20 parental stocks. Data for growth attributes showed significant differences only with respect to girth of shoots which ranged from 1.1 to 2.7 cm, however, significant environmental effect was recorded in almost all the growth characters like girth of shoots, length of shoots, plant height and even in the broodlac yield. The effect of genetic heritability estimated (Table 12) showed 32.96 and 31.72 percent for larval mortality and density respectively whereas 30.0 and 32.3 percent for girth

and shoot length/bush respectively. This erratic result was probably due to poor brood quality as reported earlier.

2.2.7 Collection, maintenance, evaluation and characterisation of lac hosts

P. Kumar, S. C. Srivastava and S. K. Jaipuria

The bushes of different species of *Flemingia* i.e., *F. macrophylla*, *F. semialata*, *F. paniculata* and colchiplod of *F. macrophylla* raised earlier in R.B.D. with three replications, were inoculated with *rangeeni* broodlac @ 50g/bush for raising *katki* '92 and *baisakhi* 92-93 crops. A comparison of plant growth attributes and lac yields (Table 13) during *katki* '92 crop season showed that *F. paniculata* was superior among the four species. The bushes of colchiplod of *F. macrophylla* showed leathery leaves, shorter height and shoot length due to its slow nature of growth. Initial larval mortality was observed to be 5 to 7% more on bushes of *F. paniculata* and colchiplod *F. macrophylla* than those of *F. semialata* and *F. macrophylla*. The percentage of male insects ranged between 52 and 78 on these species. Fecundity was better on colchiplod bushes of *F. macrophylla* compared to other species. The broodlac yield was maximum on *F. paniculata* (Table 13).

Dalbergia siemaoensis a dwarf genotype (collection from China), raised through cuttings in field conditions and *Cajanus cajan* (collection from Vietnam) raised in potted condition were inoculated with *rangeeni* brood for raising *baisakhi* 1992-93 crop. The plant growth attributes are presented in Table 14.

Table 12 Estimates of genetic/phenotypic variances and heritability of lac potentials in aghani 1992-93 lac crop on *F. macrophylla*

S.V.	Df	Mean sum of Squares					
		Lac insect attributes			Plant attributes		
		Initial mortality of lac larvae per sq. cm	Lac larvae/ sq. cm	Broodlac yield (g)	Girth (cm)	Length of shoots (m)	Plant height (m)
Replication	3	44.835	46.97	6955.58**	2.379**	62.34**	0.345*
Parent/treatments	19	42.677	29.31	985.07	0.089	8.77	0.021
Error	57	28.691	20.25	1014.37	0.0502	6.28	0.095
Total	79	32.668	23.44	1232.94	0.1478	9.008	0.0868
Standard error mean (SEX)	-	35.594	54.78	151.8875	1.59	9.511	1.896
Phenotypic variance (σ_p)	-	32.187	22.51	1007.045	0.0599	6.9025	0.07666
Genotypic variance (σ_g)	-	3.496	2.26	-7.325	0.0097	0.6225	-0.0186
Co-efficient of phenotypic variance (PCV)		15.939	8.662	20.89	19.16	27.62	18.64
Co-efficient of genotypic variance (g cv)		5.253	2.747	-1.78	6.194	8.29	-7.19
Heritability in broad sense (h^2)		32.957	31.72	-8.52	32.32	30.01	-38.58

* Significant at 5%

** Significant at 1%

Table 13 Plant growth attributes of different species of *Flemingia* and lac insect attributes of the crop raised on them, during the katki 1992 crop season

Attributes	<i>F. macrophylla</i>	<i>F. macrophylla</i> (colchiploid)	<i>F. semialata</i>	<i>F. paniculata</i>
<i>Plant</i>				
Height (cm)	122.30	98.30	135.00	154.30
Girth (cm)	0.97	1.20	1.10	1.50
Inoculable shoots (no.)	7.47	6.36	7.20	10.40
Total shoot length (m)	6.04	3.85	6.46	10.79
Internode length (cm)	6.10	6.60	8.30	7.40
Diameter of canopy spreads (cm)	61.30	31.30	50.00	45.30
<i>Lac insect</i>				
Initial larval mortality(%)	55	60	53	60
Proportion of males(%)	76	57	78	52
Fecundity per female (no.)	275	315	304	282
Yield of brood/bush (g)	179.3	187.7	292.2	386.7
Yield of other lac stick/bush(g)	107.3	136.3	156.3	208.7
Yield of sticklac/bush(g)	28.0	52.7	26.3	58.0

Table 14 Growth attributes of different lac host plants under field condition

Lac host	Plant height (cm)	No. of shoots/ plant	Total shoot length/ plant (cm)	Girth at 5th node (cm)
<i>F. stricta</i>	143.57	8.64	777.28	1.22
<i>Dalbergia siemaoensis</i>	66.00	11.20	478.20	1.54
<i>F. strobilifera</i>	120.7	6.40	487.00	1.79
<i>F. macrophylla</i>	137.3	3.11	273.54	1.63
<i>Cajanus cajan</i>	189.28	9.85	803.00	1.90

DIVISION OF CHEMISTRY

Researches in progress

3.2 Fine chemicals from lac

3.2.10 Synthesis of pheromones and juvenile hormone analogues from aleuritic acid

R.N. Majee and R. Ramani

9(Z)-hexadecen-1-yl acetate, an insect sex pheromone component, was prepared in quantity, using a modified reaction sequence which is one step shorter than that reported earlier (*Ann. Rep. 1985*). The reaction procedure was standardised and is as follows :

Methyl ester of azelaic acid aldehyde obtained from aleuritic acid, was condensed with triphenyl salt of n-heptyl bromide resulting in methyl ester of 9(Z)-hexadecenoate which was reduced with lithium aluminium hydride to get 9(Z) hexadecen-1-ol. This on treatment with Ac_2O /pyridine gave 9(Z)-hexadecen-1-yl acetate.

Besides, few insect pheromone components, viz., methyl 9(Z)-tetradecenoate, 9(Z)-tetradecen-1-ol and 9(Z)-tetradecen-1-yl acetate were also prepared in quantity again and purified by column chromatography and their purity tested by tlc.

3.2.12 Synthesis of substituted coumarin derivative from jalaric acid

N. Prasad

Last year, synthesis of substituted coumarin derivative from C-15 lactone di-acid, an intermediate product of the

synthesis, was reported. During the period, the same was synthesised again in order to standardise the method for bulk preparation as well as to study a few spectral characteristics.

Jalaric acid was oxidised by silver oxide and the resultant product, shellolic acid, (m.p. 205-206°C, av. yield 60%) was obtained. It was purified by passing through column and verified by TLC (Rf, 0.42; solvent system, ethyl acetate : acetic acid, 100:1 v/v). It was then esterified by methanol/sulphuric acid mixture to get dimethyl shellolate (m.p. 152-153°C). Dimethyl shellolate was mixed with caustic potash (1:4) and fused at 230-240°C and from this intermediate compound, i.e., C-15 lactone di-acid (m.p. 197-198°C) was obtained in an approximate yield of 40% by adopting the standard procedure. This was dehydrated over palladised charcoal followed by esterification with methanol/sulphuric acid mixture. The product thus obtained, i.e., substituted coumarin derivative in an approx yield 15%, was purified by passing through a column. The final product melted at 114-115°C and gave absorption peaks at 290 and 420 nm. It was characterized by TLC (Rf 0.18, chloroform : methanol : acetic acid, 90:10:2).

3.2.14 Derivatisation of shellac acids : Synthesis and characterisation of dioxolanes and organic nitrates

S. C. Agarwal, I. Rajendran and P.C. Sarkar

Synthesis of organic nitrates from aleuritic acid was reported last year.

During the period, synthesis of dioxolanes from butolic acid was attempted. Fractional distillation of crude butolic acid methyl ester could not be done due to certain difficulties. Hence, the barium salt of crude butolic acid was prepared by Sengupta's method. The barium salt so obtained, was extracted with alcohol, concentrated and decomposed with dil. hydrochloric acid. The acid was then extracted with ether, evaporated to get purified butolic acid, which on further recrystallisation melted at 62-63°C. A portion of the acid was subjected to Jone's oxidation to obtain 6-keto myristic acid. Further work is in progress.

3.2.15 Synthesis of isoambrettolide and exaltone from aleuritic acid

R.N. Majee and N. Prasad

Synthesis of isoambrettolide

Isoambrettolide, prepared at the Institute from aleuritic acid was compared with that obtained from M/S Encee Chemicals, Mettapalayam by thin layer chromatography. They gave single spots with same R_f values (0.75) in the solvent system, ethyl acetate:acetic acid (100 : 1, v/v).

Synthesis of exaltone

For the synthesis of exaltone, 9,10-dihydroxy hexadecane -1,16-dioic acid was prepared from aleuritic acid. The melting point of the compound was 120-122°C. The foregoing compound was treated with NBS (N-bromo succinimide) in ethyl acetate/water on steam bath for 15 min to obtain 9,10-diketo hexadecane-

1,16-dioic acid. The above diketo acid was reduced by Wolf-Krishner method by heating it with NaOH, triethylene glycol, hydrazine hydrate on steam bath for 1 h and then on oil bath at 180-200°C for 3 h. The mixture was then diluted with water, acidified and finally extracted with ethyl acetate to afford thapsic acid (hexadecane-1,16-dioic acid).

3.4 Use of shellac and modified shellac in surface coatings

3.4.7 Modification of bi-product obtained during preparation of aleuritic acid and its use in surface coatings

A.K. Das Gupta

The mother liquor obtained during preparation of aleuritic acid was acidified with 10% sulphuric acid and the gummy mass obtained was thoroughly washed with water. It was modified with BIOMINE (butylated melamine resin) 20% on the wt. of bi-product, and 2% cobalt naphthanate. The air-dried films were found smooth and uniform. The films baked at 130°C for 70 min were found smooth, uniform and non-tacky. The water resistance of the films was 6h; acid resistance, 90 min.; and alkali resistance, 2h. Films showed resistance towards acetone and alcohol but had no impact resistance and the films were not flexible.

The gummy mass was also modified with BIOMINE (40% on the wt. of gummy mass) and 2% P.T.S. The films prepared with this varnish were found smooth, uniform and non-tacky after 10 days of air-drying. The water resistance of the films was 45 min. Films passed the tests

for flexibility, resistance towards alcohol and acetone. The scratch hardness of the film was 1000. The acid resistance was 15 min and films were found to peel out from glass surface after 30 min of immersion in the alkali.

3.4.8 Lac-based coating compositions for outdoor applications

P.M. Patil

Polyester of maleic anhydride and shellac was prepared using ethylene glycol. Resultant polyester was pigmented with titanium dioxide (TiO_2). Thereafter, this paint was reacted with toluene diisocyanate (TDI)/Desmodur N/Desmodur VL/Desmodur Z to obtain urethane paints. The paints, thus obtained, were applied on mild steel panels and tested for weather resistance under atmospheric conditions.

It was observed that urethane paints from Desmodur N remained unaffected upto seven months. Loss of gloss and slight corrosion were noticed thereafter.

3.5 Use of lac for encapsulation and controlled release

3.5.6 Slow-release lac based multilayered pesticidal system for roach control

B.C. Srivastava and A.K. Jaiswal

Studies were continued on the development of the following lac-based systems for efficient control of roaches.

Multilayered pesticidal system

It was observed last year that aleuritic acid-free gummy hydrolysed

lac mass may serve as a suitable matrix for this system. The system was prepared using polythene sheet as support, release paper and gummy mass as a reservoir matrix for slow release of active ingredient (a.i.) chlorpyrifos. Sets of the above system having reservoir of 0.5% and 1% w/w a.i. and control were prepared. Similar studies were made using samples of gummy mass obtained from three commercial firms and these were found suitable for use as matrix for the system.

It was noted last year that above matrix induces slow-release action of 0.5% and 1.0% w/w chlorpyrifos reservoir. The matrix base material prepared was further bio-assayed on *Blattella germanica* for the longevity of chlorpyrifos. The test was carried out at three-month interval and two-hour exposure was given in each treatment. No activity was observed with 0.5% and 1% w/w pesticide after three months when it was used directly, whereas the activity of the a.i. in matrix persisted even after one year of preparation. The bio-assay performed after one year of preparation of multilayered system showed 10% and 30% mortality (2 h exposure) after 24h of treatment with 0.5% and 1% w/w a.i. respectively. The observation taken within a year also revealed that the activity of the a.i. in matrix was reduced with time. Thus gummy hydrolysed lac mass possesses the characteristics of slowing down and extending the period of activity of pesticide suggesting its suitability as a matrix for the above system.

Monolithic device

Studies were undertaken to prepare

lac-based 'monolith' for the control of roaches. Nine sets of the lac-based monolithic systems, having 1%, 1.5% and 2% w/w chlorpyrifos as a.i. and 2%, 4% and 6% w/w bleached lac as matrix alongwith the control were formulated and applied on plywood panels (12 x 2.5 cm) in three replicates.

Preliminary bioassay showed that 1.5% a.i. concentration is suitable for the purpose, keeping in view of the activity of the a.i. Thus monolith having 1.5% w/w a.i. and bleached lac as matrix was subjected to further preliminary bioassay. Three sets of above plywood panels applied with these lac-based monoliths were kept in 500 ml (13.5 cm high) glass jar. The insects were then released in each jar. After 3 h exposure, panels were removed and observation was recorded. It was found that panels having 0, 2, 4, and 6% bleached lac and chlorpyrifos (1.5 % w/w) exhibited 100, 60 and 0% mortality respectively within 24 h. This shows that monolith with 6% w/w bleached lac obscure completely the activity of the pesticide, whereas monolith having 4% w/w bleached lac matrix suppressed the activity moderately.

Lac sticky trap

Studies were continued to develop lac sticky trap. Gummy hydrolysed lac mass was modified with dibutyl phthalate. The modified composition alongwith unmodified one were applied as matrix with and without an attractant (dog biscuit) and subjected to bioassay. No significant trapping of roaches was observed showing the need for further modification of the composition.

3.6 Electrical properties of lac and modified lacs

3.6.5 Development of lac-based insulating material/varnishes having improved electrical properties

D.N. Goswami and S. Kumar

The results of the studies on the electrical properties of shellac-polyvinylacetal (PVA) resin blends were reported earlier. The polymer used was Synpol B-30 type.

During the period under report curing, if any, was studied between shellac and polyvinylacetal resin. For this, measurements of capacitance and dissipation factor, at 100 kHz, of the blends of solutions of these resins with time were made. Very little decrease was noticed in the above two parameters, with time, for the 70:30, 50:50 and 30:70 (parts) blends. This suggested that there might be some possibility of close association of polar groups of shellac and PVA. For shellac and PVA solutions alone, no change in the above two parameters was noticed.

The tracking property of PVA and its different blends with shellac was studied (**Table 15**). The tracking index of PVA and of the 70:30 and 50:50 (parts) shellac - PVA blends were found to be higher than that of shellac. The dissipation factor of the films cast from the blend of 50:50 shellac - PVA resin was found to be 0.006. The values of dielectric strength of different blends of solutions of shellac and PVA were measured again and the results obtained were similar to those reported earlier.

Dielectric properties of different blends of shellac with another type of polyvinylacetal (Synpol B-72) resin were studied for comparison (Table 15). Dissipation factor of the films cast from solution of PVA (B-72) was found to be 0.0034. The values for 50:50 and 70:30 shellac -PVA blends were found to be almost same and higher compared to that of the polymer. The tracking index of (B-72) PVA was found to be 282 V. This value was higher as compared to that of shellac and lower than that of (B-30) PVA. Tracking index of 70:30 shellac-PVA blend was found to be 272 V. Dielectric strength of the same composition was 60 kV/mm. Further study is in progress.

Table 15 Electrical properties of shellac-polyvinylacetal (PVA) blends

Material	Tracking Index (Volts)	Dissipation factor	Dielectric strength kV/mm
<u>Shellac</u>	256	-	40
Polyvinylacetal(B-30)	320	-	68
Polyvinylacetal(B-72)	282	0.0034	62
<u>Blends</u>			
70:30 shellac-PVA(B-30)	300	-	55
70:30 shellac-PVA(B-72)	272	0.006	60
50:50 shellac-PVA(B-30)	284	0.006	68
50:50 shellac-PVA(B-72)	-	0.0034	-

Ad hoc Studies

Development of plant growth regulators from aleuritic acid

I. Rajendran and S.C. Agarwal

The project was taken up to synthesise plant growth regulators from aleuritic acid, the major constituent acid of lac resin. Aleuritic acid was isolated in quantity from sticklac and the crude acid was purified by standard methods.

Periodate oxidation of aleuritic acid was carried out using potassium periodate/sulphuric acid to get the hemialdehyde and neutral hydroxyaldehyde. The bicarbonate extract of the reaction product was neutralised by ice-cold H_2SO_4 to get milky white crude hemialdehyde. The product was then immediately extracted with boiling petroleum ether (PE, 40-60°C) leaving semisolid impurities. The extract was cooled to recover the extracted material as white solid. It was filtered and recrystallised from warm water to get shiny plates of pure compound (m.p. 37-38°C).

The contents of the hemialdehyde, ethylene glycol in benzene (sodium, sand dried) along with catalytic quantity of p-TSA were refluxed using Dean-Stark apparatus for 14 h. The contents were cooled and extracted with ether. Ether layer was washed with water and dried (anhyd. Na_2SO_4) to get the crude acetal as light yellow liquid.

TLC of the acetal was carried out using the solvent systems of (i) 25% ether in PE (40-60°C), (ii) benzene, acetone (5:1), (iii) benzene, (iv) benzene and hexane (1:1). The crude acetal was

then charged on a silica gel column. The material was eluted using hexane (sodium dried) with increasing concentration of benzene until the pure compound was eluted completely. The above experiment was repeated to obtain more quantity of acetal.

Condensation polymerisation of shellac with synthetic vinyl monomer

K. M. Prasad

Shellac was dewaxed by solvent extraction method and the shellac thus

obtained was found to contain 0.4% wax. From this shellac its methyl ester was prepared by refluxing it with dried methanol (1:10 w/w) using HCl as catalyst. The product was very viscous with zero acid value. This methyl ester of shellac will be reacted with vinyl monomer to obtain polymer.

Table 10. Bond strength of shellac modified with hydroxy acid

Hydroxy acid	Bond strength
100	0.15
80	0.12
60	0.14
40	0.11
20	0.13
10	0.16
5	0.17
0	0.18

It was observed that 40-60 shellac/dried acid composition

SECTION OF TECHNOLOGY

Researches in progress

4.3 Use of lac in adhesives

4.3.7 Preparation of lac-based hot-melt adhesive

P. C. Gupta

During the period under report, shellac was modified with different proportions of hydrolysed lac by heating together at 150°C for five min. It was applied at the same temperature to test for the bonding of mild steel to mild steel surfaces. The bond strength was determined after 24 h. The results are given in **Table 16**.

Table 16 Bond strength of shellac modified with hydrolysed lac

Shellac : Hydrolysed lac	Bond strength ton/sq.inch
100 : 0	0.12
90 : 10	0.12
80 : 20	0.14
70 : 30	0.16
60 : 40	0.19
50 : 50	0.36
40 : 60	0.40
30 : 70	0.31
20 : 80	0.27
10 : 90	0.24
0 : 100	Nil

It was observed that 40:60 shellac:hydrolysed lac composition

possessed maximum bond strength. This composition was applied over carton and paper surfaces which could be jointed satisfactorily.

4.4 Pilot plant studies of lac based products and processes

4.4.3 Standardisation of recovery of lac dye process and its pilot plant studies

P. C. Gupta and A. Pandey

It was reported last year that two methods were tried for the preparation of water-soluble lac dye. In the first method lac dye was obtained through preparation of its calcium salt and converting it into sodium salt. The dye thus obtained was not completely soluble in water. In the second method, filtered wash water was treated with cation exchange resin and the dye obtained through evaporation, which was also only partially soluble. It was concluded that wash water contained some water-soluble impurities which brought insolubility.

The earlier method of Sengupta and Ghosh (1973) involved addition of sulphuric acid to wash water and processing of the filtrate obtained to recover the dye. This method resulted in precipitation of 40% lac dye and the rest remained in the solution. The precipitated dye had to be recovered by repeated boiling with water. This method was thus cumbersome and also involved use of larger quantities of chemicals for the isolation of the dye.

The wash-water was found acidic with pH 4.5 - 5.0. It was filtered through filter paper and the calcium salt of dye was prepared directly without adding sulphuric acid. It was washed, dried and converted into sodium salt by triturating it with 10% sodium carbonate solution. It was left for some time and then filtered. The filtrate was treated with requisite amount of cation exchange resin (IR-120). The solution was evaporated on water bath to dryness (average yield : 0.6% on the weight of *rangeeni* sticklac). The lac dye so obtained was readily soluble in water.

Ad hoc study

Preparation of dewaxed decolourised lac of improved quality (wax content 0.1 per cent)

R. K. Banerjee

Dewaxed decolourised lac having wax content of 0.1 per cent or below is much

in demand in foreign countries. The present work was taken up to prepare the same.

During the year under report, experiments were carried out to prepare dewaxed decolourised lac of low wax content from *kusmi* seedlac by further lowering the temperature (8-10°C) of solution during dewaxing. The product thus obtained had wax content of 0.1% with colour index, 1.5.

DIVISION OF EXTENSION

Research in progress

5.5 Operational research project for maximising lac production in Chhotanagpur area

R. C. Mishra and J. Lal

Operational researches on the transfer of technology in respect of lac and other agricultural crops were continued in the Phase III operational area of the project covering two backward tribal villages, namely, Chitir and Dundu of Namkum Development Block of Ranchi district.

Lac culture

Trial-cum-demonstrations of improved methods of lac cultivation on *ber* and *palas* were continued.

Baisakhi 1991-92 was harvested as *ari* during May/June 1992 from 34 *ber* trees. An average yield of 3.3 kg sticklac per tree was obtained as against 0.7 kg/tree from the trees operated traditionally.

Baisakhi-cum-katki 1991-92 broodlac crop was harvested in October 1992 from 156 *palas* trees of first broodlac coupe. These had been pruned during April/May 1991 and inoculated in October the same year and subsequently left for self inoculation during July 1992. An average broodlac yield of 2.2 kg per tree was obtained against 0.3 kg/tree recorded from the trees operated traditionally.

During the rainy season, seedlings of the lac host *bhalia* (765 no.) *galwang* (465 no.) and *ber* (95 no.) were distributed among the farmers or establishing them

in their backyard or fields for augmenting lac production in future.

Agricultural crops

Summer rice production was encouraged and carried out by six farmers covering a 0.92 acre area. An average paddy yield of 24.84 q/ha was recorded.

Horticultural crops

Popularisation of improved varieties of vegetable seeds was continued. Arrangements were made for the purchase and planting of improved stocks of guava, litchi, mango, coconut and *tejpatta* by the interested farmers.

Extension education

Farmers' forum meetings were organised every month and discussions were held on the results of demonstrations, profitability of new technologies, needs and constraints of the farmers etc.

Ad hoc study

Analysis of growth variation and instability in production, export and price of lac in India

S. K. Saha and A. K. Jaiswal

The scope of forecasting the yield of sticklac using economic attributes was studied through uni- and multivariate regression analysis. The sticklac production of the country was taken as the dependent variable and lagged yield, world demand, rise in export price, price fluctuation, sticklac price and Thai

sticklac production as independent variables. Prediction model developed by retaining lagged yield and Thai lac production was found efficient for forecasting the yield of sticklac and they explained 67 per cent variation. Auto correlation studies also confirmed that lagged yield exerted a significant effect on the level of production of sticklac in subsequent years.

Quinquennial and decennial simple

growth rates and instability for lac production in India over a span of last 60 years showed that except during thirties and fifties, the growth rates were negative. Highest negative growth rate and instability was observed during sixties. Study of the year-wise fluctuation (per cent) from trend line (per cent) revealed that the shortfall in lac production is not cyclic in nature.

SUMMARY

DIVISION OF ENTOMOLOGY

Researches in Progress

- 1.1.9 Pruning operations on the *kusum* trees were done as per the technical programme. Lac crops could not be raised due to shortage of broodlac.
- 1.1.10 Field trials on *akashmani* have shown that February, July and October are the suitable months for pruning. The optimum brood rate and age of shoots were 10 - 20g/m shoot length and 18 months respectively.
- 1.2.5 Studies were made on the effect of soil application of N, P and K, individually and in all possible combinations, on the economic attributes of *rangeeni* and *kusmi* lac insects cultured on *bhalia* and *galwang*.
- 1.4.17 A study of the samples collected fortnightly from the *baisakhi* 1992-93 crop on *bhalia* bushes in the field did not reveal any occurrence of mortality of lac insects due to microbial disease.
- 1.4.18 Plant-origin insecticide formulations, namely, R.D.-9 Repelin, Neemark and Neemguard inhibited hatching of the eggs of the lac predator, *Eublemma amabilis*. Diflubenuron (0.05%) individually and in combination with any one of the above insecticides gave significant suppression of lac predators.
- 1.4.19 Field trials were carried out on *palas* at Kundri lac orchard to improve the recommended integrated pest control schedule in lac cultivation. Introduction of BHC (0.05%) and dipping of the broodlac in Thiodan (0.05%) before inoculation improved the suppression of insect pests resulting in better lac yields.
- 1.5.8 Eight lac insects stocks of different regions were maintained.
- 1.5.13 The life periods of F_6 generation of *rangeeni* x *kusmi* crosses were highly variable. Study of a cross of the new cream colour variant with the yellow mutant has indicated that the gene for cream phenotype is recessive to the allele for the wild phenotype and non-allelic to the yellow gene.

Ad hoc studies

- Differences in the attraction of the insects associated with lac, towards some colours were found. The degree of attraction towards natural light was, in general, maximum.
- *Holcocera pulverea*, a major lac predator has been reared, upto adult stage, on artificial diets.

SECTION OF PLANT SCIENCES

Researches in progress

- 2.1.9 Air-layers of *kusum* were prepared using different hormones and *Sphagnum* moss + lanolin paste as rooting medium.

- Cent per cent rooting was observed with the application of IAA (100 ppm), IBA (100 ppm), NAA (50 ppm), IAA + NAA (100 ppm), IBA + NAA (100 ppm) or IBA + IPA (50 ppm).
- 2.1.11 Growth attributes of different lac hosts were studied during the third year after planting. Maximum growth was observed in *akashmani*, followed by *galwang*. Percent increase in plant height and girth over the previous year was, however, maximum in *kusum*.
- 2.1.12 Plants of *F.strobilifera* were raised to study the effect of fertilizers and coppicing height.
- 2.2.6 Study of genetic variation of *bhalia* showed 32.96 and 31.72% heretabilities for the larval mortality and density of lac insect settlement, respectively.
- 2.2.7 Plant growth attributes of three *Flemingia* species and a colchiploid of *F.macrophylla* and the economic attributes of the lac crop raised on these species were studied. *F.paniculata* was the best with respect of the plant attributes and the lac yield.

DIVISION OF CHEMISTRY

Researches in progress

- 3.2.10 9(Z)-hexadecen-1-yl acetate was prepared by a modified reaction sequence. The reaction procedure was standardised. Methyl 9(Z)-tetradecenoate, 9(Z)-tetradecen-1-ol and 9(Z)-tetradecen-1-yl acetate were also prepared in quantity.
- 3.2.12 Substituted coumarin derivative was synthesised in an approximate yield of 15% starting from jalaric acid. Some of the characteristics of the final product and an intermediate compound were determined.
- 3.2.14 Butolic acid was subjected to Jones's oxidation to obtain 6-keto myristic acid.
- 3.2.15 A sample of isoambrettolide obtained from a private firm was compared with that prepared at the institute. Both the samples were found to give single spots with identical Rf values. Thapsic acid (hexadecane-1,16-dioic acid) was prepared from 9,10-dihydroxyhexadecane-1,16-dioic acid (obtained from aleuritic acid).
- 3.4.7 The gummy mass obtained during preparation of aleuritic acid was modified with 20% BIOMINE and 2% cobalt naphthanate and this was found to be suitable as baking type of varnish. The above gummy mass then modified with 40% BIOMINE and 2% PTS and was found suitable as air-drying type of varnish.
- 3.4.8 Polyesters prepared from shellac-maleic anhydride glycol were reacted with different isocyanates. The shellac urethane paints obtained from Desmodur N, when tested for outdoor applications remained unaffected upto eight months.
- 3.5.6 It was found that aleuritic acid-

free gummy hydrolysed lac mass can serve as a matrix for a slow-release multilayered pesticidal system for roach control. Bioassay showed that it possesses the characteristics of reducing and extending the activity of the active pesticide chlorpyrifos.

Studies were also undertaken to prepare lac based pesticidal 'Monolith'. It was observed that bleached lac suitably obscured the activity of the pesticide.

- 3.6.5 Dielectric properties of blends of shellac and two types of polyvinylacetal resin (Synpol B-30 and B-72) were studied separately. Dielectric strength and tracking index values of the individual polymers and of their certain blends with shellac were found to be better than those of shellac.

Ad hoc studies

- Aleuritic acid was subjected to periodate oxidation to get azelaic semialdehyde. The semialdehyde was acetalised using ethylene glycol in the presence of *p*-TSA to obtain the acetal which was then purified by column chromatography.
- Methyl ester of dewaxed shellac was prepared by reacting it with methanol using HCl as catalyst.

SECTION OF TECHNOLOGY

Researches in progress

- 4.3.7 Hot-melt adhesive composition based on shellac and hydrolysed lac (40:60) yielded bond strength of 0.40 ton/sq. inch as against 0.12 ton/sq. inch of plain shellac.

- 4.4.3 The process of recovery of lac dye from wash water was shortened by one step and the process standardised.

Ad hoc study

- Dewaxed decolourised lac having wax content 0.1% could be prepared by lowering the temperature of the *kusmi* seedlac solution to 8-10°C during dewaxing.

EXTENSION DIVISION

Researches in progress

- 5.5 Trial-cum-demonstrations, of improved lac cultivation technologies were given, on the *palas* and *ber* trees of farmers in Chitir and Dundu villages of Namkum Block, Ranchi district. Marked increase in the yields of broodlac (about 7 times) and sticklac (about 5 times) over the villager's method were obtained. Seedlings of lac host plants were also distributed among the farmers of the area.

Growing of improved varieties of horticultural crops were also popularised. Demonstrations of Sonalika wheat and summer rice crop were also arranged.

Ad hoc study

- Scope of forecasting the yield of sticklac using some economic attributes was investigated through regression analysis. The model based on lagged yield and Thai lac production was found to be efficient in predicting lac yields. Some aspects of the fluctuations in lac production during the past sixty years were also studied.

PUBLICATIONS

Research Papers

Goswami, D. N. (1992) Tracking property of epoxy resin modified shellac varnish, *Res. Indus.*, **37**, 151

Majee, R.N. and Ramani, R. (1993) Facile synthesis of (Z)-9- Hexadecen-1-ol and its acetate, *Indian Chem. Soc.*, **70**, 167

Saha, S.K. (1992) Mechanism of degradation of lac on ageing, *J. Polym. Materials*, **9**, 229

Saha, S.K. and Jaiswal, A.K. (1993) Growth and instability in lac production in India, *Ann. agric. Res.*, **14**(1), 45

Saha, S.K. (1993) Studies on storage

of lac, *Indian Shellac*, **1**, 17

Popular Article

Goswami, D.N., Ramani, R. and Sen, A.K. (1993) Lac-Changing Scenario, *Indian Shellac*, March, 19

Pamphlet, Books etc. Published by the Institute

- ILRI — its contribution to the nation (a booklet)
- "Lakh Shabdavali", English - Hindi, (a booklet, 20pp)
- ILRI Newsletter, 8pp □

EXTENSION ACTIVITIES

Training

A DTP system, heavy-duty multi-colour photostat machine and a portable overhead projector were procured for

publicity work.

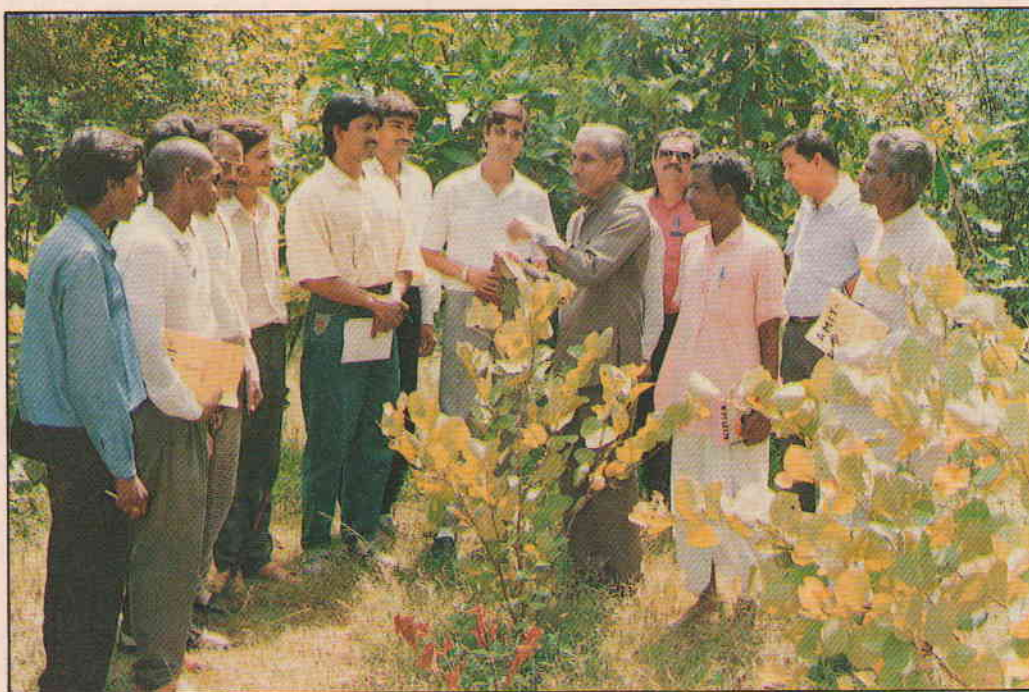
Regular training courses were organised as per the details given in **Table 17**.

Table 17 **Details of the regular training programme**

Course (duration)	Sponsor	Period	No. of successful candidates	State
<u>Long term courses</u>				
Improved Methods of Lac Cultivation (6 months)	-	April to Sept. 1992	1	Bihar
Industrial Uses of Lac (3 months)	D. I. C., Purulia, W.B.	Oct. to Dec., 1992	3	West Bengal
<u>Short term courses</u>				
Lac cultivation, Processing and Utilisation (one week)	Indian Farmers Service Instt., Ranchi.	10 - 21.4.92 17 - 23.9.92	10 9	Bihar Bihar
-Do-	TRIFED, Ranchi	28.9.92 to 8.10.92	7	Bihar
Lac cultivation Processing and Techniques of Lac Demonstration (one day)	BISCOLAMF		16	Bihar
Total			46	



Trainees receiving practical demonstration at the institute plantation, on improved methods of lac cultivation



Trainees sponsored by TRIFED receiving training on lac cultivation techniques.

Supplementary Courses (One day)

Sponsoring organisation	No. of batches	Particulars of trainees	
		Description	Number
Divyayan K.V.K., R.K. Mission, Ranchi, Bihar	7	Progressive farmers	256
Institute for Rural Industrialisation, Ranchi, Bihar	2	Social Catalysts	34
Forest Rangers' College Angul, Orissa.	1	Forest Range Officers (Trainees)	24
Forest Rangers' College Khurseong, West Bengal	1	-Do-	43
Bihar Tribal Research Instt., Ranchi, Bihar	2	Govt. functionaries	20
Birsa Agricultural University, Ranchi, Bihar	1	B. Sc. Forestry students	22
Xavier Institute of Social Sciences, Ranchi Bihar	2	Students of P.G. Diploma in Rural Development	72
O.R.P.	1	Progressive farmers	7
Total	17		478

Planning of an "Entrepreneurial Development Programme for Entrepreneurs related to Lac Industry" was coordinated for SBI Zonal office, Ranchi. The programme was organised at State Bank Training Centre, Ranchi from 22 to 24.3.1993. A team of two scientists (Shri R.C. Mishra and Dr B.C. Srivastava) of the Institute delivered lectures and presented the technological profile before the participants.

Technical advisory service

A large number of postal as well as personal enquiries were attended to and technical problems of lac traders, farmers, research scholars and development organisations were solved with the help of specialists of the Institute.

A guest lecture was delivered on the "Problems of pollution in lac factories" at the 35th All India Conference of Chairmen and Member-Secretaries of State Pollution Boards held at Patna during 21-24.4.92 and an exhibition of lac technologies was also organised.

Full technical cooperation was extended to the TRIFED in planning Lac demonstrations, purchase of quality broodlac and other lac related activities from time to time.

A total of 29 lac crop and broodlac samples received from lac growers/organisations were examined free of charges and reports in respect of forecast of larval emergence and causes of mortality were supplied.

Large scale cultivation of lac at Kundri

Regular technical assistance to the Forest Deptt., Bihar in running their Kundri Lac Farm having 43,000 *palas* and other lac host species was continued.

During May 1992 *ari* harvesting-cum-pruning operation on 16,372 *palas* trees of coupe B and C yielded 4,350 kg sticklac.

During October-November 1992 mature crop was harvested from 7322 trees and 8,010 kg broodlac was obtained. Out of this broodlac 7,510 kg was used to

inoculate 12,036 *palas* trees which had been pruned during May and 500 kg was distributed free of cost to 100 tribal and needy families of lac cultivators. Lac cultivation activities of this farm provided 2566 mandays direct employment to the tribal and poor peasants inhabiting the adjoining villages.

Kisan mela and exhibitions

The Institute arranged exhibitions on lac and lac technologies as per the details given below :

Date(s)	Locations	Organising Institutes	No. of visitors
22-23.4.92	35th All India Conference of Chairmen & Member-Secretaries of State Pollution Control Boards at Beltron Bhavan, Patna	Bihar State Pollution Control Board	125
7.5.92	Kharif Kisan Mela, B.A.U., Kanke	Birsa Agricultural University	150
3.2.93	Jagriti Mela at Pithraul & Lalganj village	1890, Light Regiment	366

Date(s)	Locations	Organising Institutes	No. of visitors
4-5.2.93	Annual Kisan Mela, Getalsud Farm, Ranchi	Divyayan, KVK, R. K. Mission, Ranchi	2000
22-24.3.93	Entrepreneurial development programme related to lac industry at Staff Training Centre, SBI, Doranda, Ranchi	State Bank of India, Zonal Office, Ranchi	220

Exhibit materials on lac were also supplied to St. Xavier's College, Ranchi.

Testing

Testing of samples of lac and lac products received from government organisations and private industries were carried out on payment of a nominal fee. In addition, lac samples from different divisions/sections of the Institute were also tested. During the period, 253 samples of seedlac, shellac and other lac-based products were analysed and 536 tests were carried out □



Members of the study team of the Committee on Agriculture holding discussion with the officials of the participating organizations/departments at Hotel Ashoka, Ranchi



MISCELLANEA

SEMINARS, SYMPOSIA ETC.

Organised

A study team of the Committee on Agriculture, comprising of Hon. Sompal, M.P. (Chairman), Hon. Ram Tahal Choudhary, M.P., Hon. Bhogendra Nath Jha, M.P., Hon. Upendra Nath Verma, M. P. alongwith Dr T.P. Ojha, DDG (Engg), ICAR and Lok Sabha Secretariat personnel, visited Ranchi to review the activities of ILRI, CHES, Ranchi (IIHR) and BAU.

A meeting was organised at Hotel Ashoka, Ranchi on 2.6.1992 where, Dr. H.R. Mishra, Vice-Chancellor, Birsa Agricultural University, Shri S. Kumar, Director, ILRI, Dr D.P. Singh, Head, CHES, Ranchi presented the

achievements and activities of their institutions and replied to the queries made by the honourable members of the Committee.

Sri M. Lal, Joint Commissioner (Agriculture) and Shri P.K. Dixit, Additional Commissioner (Agriculture) also attended the meeting alongwith the departmental heads of the above institutions and state government officials.

The committee visited ILRI, the next day. The members were shown around the museum to acquaint them with the research activities of the institute. The honourable members of the committee also planted saplings of lac host plants in the institute plantation.

AUXILIARY/SUPPORTING SERVICES

Library

Library continued to provide literature search and consultation services to the scientists of the institute as well as to a number of scholars, professors and research workers from other institutions viz., B.I.T., Ranchi; Ranchi University, Ranchi; I.I.T., Kharagpur; N.M.L., Jamshedpur; Patna University, Patna and Bihar University, Muzaffarpur.

Details of the library holdings are described below :

Documents	Addition during the period	Total
Books, bound volumes	308	20,819
Annual Reports	121	1940
Reprints, photocopies etc.	10	220
Bulletins, Research notes etc.	-	501

A sum of Rs. 6.12 lakhs was spent on the acquisition of periodicals and other forms of publications during the year.

Purchase of books and periodicals was made on the basis of the guidelines received from Good Offices Committee, New Delhi and I.C.A.R. Most of the periodicals/books were purchased directly from the publishers.

To apprise the scientists working in the institute, "Selected list of forthcoming conferences/seminars" was prepared and circulated. So far, six issues of this list have been circulated.

The library continued to maintain

exchange of I.L.R.I. publications with many scientific libraries of the country and abroad.

Details of the library acquisitions are :

Particulars	National	International
Number of journals subscribed	60	30
Number of journals acquired in exchange or <i>on gratis</i>	32	14
Number of research institutes/information centres with whom Institute library maintains exchange relationship	102	17

The Institute library continued as a contributing member of NUCSSI (National Union Catalogue of Scientific Serials in India), a project sponsored by INSDOC, New Delhi for National Holdings Network in science and technology in India.

The library continued to be an institutional member of British library services through I.C.C.R. (Indian Council for Cultural Relations) and utilizes their lending services for the benefit of scientists of the Institute.

One PC/AT-386 "WIPRO" with DOS 5.00 version alongwith a Dot-Matrix Printer was procured and installed in the library for computerised storage and retrieval of information.

Technical and Monitoring Cell

The cell continued to provide services for the research activities of the institute. The Cell convened meetings of the Staff Research Council for reviewing the

progress of ongoing research projects, to examine the new research projects to be undertaken and also prepared the proceedings of the meetings for circulation. Besides, the Cell maintained research project files. Activity milestones of different research projects were also compiled for onward transmission to the Council. Various reports such as monthly report for the Cabinet, Quarterly report for the O.R.P., twenty point programme, material for DARE report and Research Highlights of ICAR were also compiled. The Cell also processed the research papers for forwardal to scientific and popular journals.

Official Language Unit

With a view to implement the Official Language Policy and Annual Programme prepared by the Government of India for progressive use of Hindi in Official work, the official language unit has been established in the Institute which comprises of one Assistant Director (O.L.) and one Hindi Translator. The unit provides the following services :

- Holding meeting of the Official/ Language Implementation Committee, preparation of agenda, minutes, proceedings and taking follow-up actions.
- Translation of office orders, circulars, memos, tenders, notices, quotations, Hindi summary of Annual Report of the Institute etc.
- Nomination of non-Hindi speaking staff for Hindi-training organised by the Hindi teaching scheme.
- Celebrations of Hindi Day, Hindi Week; organising competitions in Hindi.

- Procurement of literature in Hindi.

Farm Unit

Management and general maintenance of the institute plantation area and the campus were continued. Hoeing, weeding, mulching and ploughing operations were carried out in different plots of lac hosts. The gaps in the plots of various lac host species were filled with appropriate seedlings. Necessary arrangements were made for irrigation and transportation related to research work and also for the security of the farm. Seedlings of lac host plants were raised for distribution in the ORP area.

Ornamental and seasonal flower plants were raised and planted in different places for beautification. *Kusmi* and *rangeeni* crops were also raised on *kusum*, *ber*, *palas*, and *khair* plants for display purposes. The total returns from the Farm through sale of farm produce, fire wood, ornamental plants etc. was Rs 4,325.

Maintenance and Workshop

The workshop-cum-Maintenance unit continued to maintain the water and electricity supply lines to the laboratories and the campus, including staff quarters, farm etc. Minor repairs of laboratory and farm equipments and fabrication of parts were also undertaken. Number of different jobs undertaken were : electrical, 742; mechanical and plumbing, 232; instrument repairing, 310; carpentry, 230; welding etc. 193.

Art and Photography

The art and photography unit rendered services in support of research and extension activities. Pictures of lac insects and associated insects, lac hosts, other research materials and of different functions of the institute were taken. This included about 160 colour photographs and 37 colour slides.

Health Care

A part-time Authorised Medical

Attendant visits the Institute to attend to the medical needs of the staff and their dependants, on all working days. He is supported by one Stockman - cum - Compounder and an attendant. During the period, 4828 patients were examined in the ILRI Dispensary, 75 patients were referred to Ranchi Medical College Hospital or specialists. Besides, bills submitted by the staff were also processed for medical reimbursement.

IMPORTANT COMMITTEES

Management Committee

The Management Committee assists the Director in monitoring the progress of research under various research programmes of the institute and suggests suitable modifications, new researches etc. It helps in solving the problems related to research and administration. The Committee also helps in formulating the proposals for Annual and Five Year Plans.

The constituent members of the Committee were as follows :

Sri S. Kumar	Chairman
Director	
Indian Lac Research Institute	
Namkum, Ranchi	

Dr G. Singh	Member
Assistant Director General (Engg)	
Indian Council of Agric. Res.	
Krishi Bhavan, New Delhi	

The Additional Chief Conservator of Forests (Minor Forest Produce), Office of the Principal Chief Conservator of Forests, Bhopal, MP	Member
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Dr P.K. Sen Sarma	Member
Emeritus Scientist, Centre for Wastelands Development, North-Eastern Hill University, Shillong Flat No. 1, 2nd Floor, West Block 302 N.S.C. Bose Road, Calcutta - 7	

Mrs. Basanti Devi	Member
Ex-MLA, Thejar, Distt. Rohtak, Haryana	

Sri Balbir Singh Bartana	Member
Ex-MLA, Flat No. 329, Sector 37A, Chandigarh, Punjab	

The Finance & Accounts Officer	Member
C R R I Cuttack	

Dr P. Kumar
Principal Scientist & Head, Section
of Plant Sciences
Indian Lac Research Institute
Namkum, Ranchi

Member

Dr A. Pandey
Senior Scientist
Indian Lac Research Institute
Namkum, Ranchi

Member

Sri R.C. Mishra
Scientist (SG) & Head, Division
of Extension
Indian Lac Research Institute
Namkum, Ranchi.

Member

The Administrative Officer
Indian Lac Research Institute
Namkum, Ranchi

Member-Secretary

Dr B.P. Singh
Senior Scientist
Indian Lac Research Institute
Namkum, Ranchi

Member

The 18th and 19th meetings of the Management Committee were held on 4th December 1992 and 13th March 1993 respectively at this Institute.

SPORTS

ICAR Zonal Sports Meet

The Institute team, comprising of 45 participants, Dr N. Prasad (Sr. Sc.) as Chief-de-Mission and Sri A.K. Sahay

1992-93 held at C.R.R.I., Cuttack during 6.11.92 to 12.11.92.

In the Team-event, our Institute Badminton Team, comprising of Sri N.K.

Dey, Sri D.W. Runda, Dr A. Bhattacharya, Sri A.K. Sahay and Sri H.S. Munda became the champion in the tournament. Sri N.K. Dey also won the individual championship in Badminton. In track and field events, Sri D.W. Runda won the 2nd prize in 1500m race.



(T-5) and Sri B.N. Gope, as team managers, took part in the Zonal Inter-Institutional Tournament for the year

ICAR Inter-Zonal Sports Meet

Our Institute's badminton team comprising of Sarvashree N.K. Dey, A. K. Sahay, Dr A. Bhattacharya, D.W.

Runda and D.K. Singh with Shri A.K. Sahay (T-5) as team manager also took part in the Inter Zonal Tournament held at National Bureau of Soil Survey and

Land use Planning, Nagpur, during 28 - 31 March 1993. The team won the runner-up title in the tournament.

VISITORS

The Institute continued to attract visitors from this country as well as from abroad. During the period, the Institute received visitors which included students, V.I.P.s, foreign nationals, educationists, scientists and others. Some of the distinguished visitors were :

Prof R. Watanabe, Faculty of Agriculture, Chuo University, Tokyo.

Mr H. Watanabe, Faculty of Agriculture, Kyoto University, Kyoto, Japan

Mr H. Suzuki, Lac Businessman, Tokyo, Japan

Mr M. Suzuki and Mr. M. Sawada, Lac Businessmen, Tomen Chemical Company Ltd., Tokyo, Japan

Mr T. Prasad, Managing Director, Bihar State Co-operative Lac Marketing Federation, Ranchi

Hon. Upendra Nath Verma, Member of Parliament, 34 Aurengzeb Road, New Delhi - 11

Dr T.P. Ojha, D.D.G. (Engg), I.C.A.R., Krishi Bhavan, New Delhi

Hon. Sompal, Member of Parliament, 28 Lodhi Estate, New Delhi

Hon. Ram Tahal Chaudhari, Member of Parliament, Ranchi

Hon. Bhogendra Jha, Member of Parliament, Madhubani, Bihar

Mr K.P. Rao, General Manager-cum-Zonal Manager (Eastern Zone), Tribal Cooperative Marketing Development Federation of India Ltd., Calcutta

Dr S. Chinamani, A.D.G. (Agroforestry), I.C.A.R., Krishi Bhavan, New Delhi

Dr G. Singh, A.D.G. (Engg), ICAR, Krishi Bhavan, New Delhi

Dr P. K. Sen-Sarma (Member, Institute Management Committee), Retd. Dean of Forestry, BAU, Kanke, Ranchi

Mr M.K. Sinha, Chief Manager (Dev., S.I.B.), State Bank of India, Zonal Office, Ranchi

Mr C.K. Roy, Chief Manager, State Bank of India, Head Office, Patna

Mr D.J. Mitra, D.F.O., Social Forestry Research and Evaluation Division, Ranchi

Mr S.G. Upadhyaya, Deputy Regional Director, N.C.D.C., Patna

Mr M. Lal, Joint Commissioner, Govt. of India

Mr B.K. Dixit, Additional Commissioner (Agriculture), Ministry of Agriculture, Govt. of India.



Meeting of the institute Management Committee in progress



Hon, S. Pal M. P., chairman of the study team on Agriculture, planting palas sapling at the institute plantation.

PERSONNEL

i) List of personnel as on 31.3.93

Director

Sri S. Kumar

Division of Entomology

Head of Division

Sri A.H. Naqvi

Scientist (S.G.)

Sri R. Ramani (Agric. Entomol.)

Scientist

Sri S.G. Choudhary (Agric. Entomol.)

Dr A. K. Sen "

Dr S.K. Jaipuriar "

Dr A. Bhattacharya "

Sri Y.D. Mishra "

Sri M.L. Bhagat "

Sri K.K. Sharma "

Technical Officer

Sri A.K. Sahay (T-5)

Field/Farm Technician

Sri R.N. Vaidya (T-4)

Sri M. Rabidas (T-II-3)

Sri R.D. Pathak (T-1-3)

Sri R.L. Ram (T-I-3)

Sri H.N. Shukla "

Sri K.P. Gupta "

Sri K.C. Jain (T-2)

Sri D.K. Singh "

Sri A.K. Sinha "

Sri D.W. Runda (T-1)

Sri P.A. Ansari "

Sri R.G. Singh "

Lab Technician

Sri Bhola Ram (T-II-3)

Sri G.M. Borkar (T-1-3)

Sri S.K. Chatterjee "

Sri G. Das "

Sri R.K. Swansi "

Regional Field Research

Station, Dharamjaigarh

Field/Farm Technician

Sri R.S. Maliya (T-II-3)

Sri Jiwan Lal (T-I-3)

Lab Technician

Sri A. Hussain (T-1-3)

Section of Plant Sciences

Head of Section

Dr P. Kumar

Senior Scientist

Dr B.P. Singh (Agron.)

Scientist

Sri S.C. Srivastava (Plant Breeding)

Lab Technician

Sri D.D. Prasad (T-1-3)

Sri Mohan Singh (T-2)

Field/Farm Technician

Sri K.A. Nagruar (T-2)

Division of Chemistry

Head of Division

Dr S.C. Agarwal

Senior Scientist

Dr D.N. Goswami (Physics)

Dr B.C. Srivastava (Org. Chem.)

Dr N. Prasad "

Dr R.N. Majee "

Scientist (Senior Scale)

Dr K.M. Prasad (Org. Chem.)

Scientist

Sri A.K. Das Gupta (Org. Chem.)

Sri P.M. Patil (Phys. Chem.)

Sri I. Rajendran (Org. Chem.)

Sri P.C. Sarkar "

Technical Officer

Sri D.D. Singh "

Lab. Technician

Sri N.K. Dey (T-4)

Sri T.K. Saha "

Sri M. Ekka "

Sri U. Sahay (T-1-3)

Sri B.P. Keshry "

Sri P.B. Sen "

Smt. P. Devi (T-2)

Sri H. Das (T-1)

Glass Blower

Sri B.S. Chaudhari (T-1)

Jr Stenographer

Sri B.K. Rajak

Section of Technology

Head of Section

Dr P.C. Gupta

Senior Scientist

Dr A. Pandey (Phys. Chem.)

Scientist

Sri R.K. Banerjee (Org. Chem.)

Sri Radha Singh (Phys. Chem.)

Technical Officer

Sri M. Islam (T-5)

Lab Technician

Sri K.K. Prasad (T-4)

Sri N. Minz (T-1-3)

Sri M.K. Singh "

Sri T. Ram "

Sr Mechanic

Sri S.K. Srivastava (T-4)

Division of Extension

Head of Division & Incharge ORP

Sri R.C. Mishra

Principal Scientist

Dr S.K. Saha (Phys. Chem.)

Scientist

Sri J. Lal (Agric. Entomol.)

Dr A.K. Jaiswal "

Technical Officer

Sri A. Rahman (T-5)

Sri B.P. Banerjee "

Sri R.C. Maurya "

Sri D. Ghosh "

Sri L.C.N. Shahdeo "

Lab Technician

Sri K.M. Sinha (T-4)

Sri J. Singh "

Sri B.P. Ghosh (T-I-3)

Sri J.K. Ambuj (T-1)

Field/Farm Technician

Sri H. Bhengra (T-4)

Sri S.S. Prasad (T-1-3)

Sri S.B. Azad (T-1)

Jr Artist-cum-Photographer

Sri R.P. Srivastava (T-2)

Museum Assistant

Smt. R. Sen (T-1)

Jr Stenographer

Sri A.K. Sinha

Driver

Sri Bandhan Runda (T-2)

Publicity Officer (Auxiliary)

Sri Lakhan Ram

Administrative and Audit & Accounts Section**Administrative Officer**

Sri Shyam Narayan

Asst. Admin. Officer

Sri H.S. Munda

Finance & Accounts Officer

Sri Pradeep Kumar

Superintendent

Sri Md. Samiullah

Sri N. Mahto

Sri A.K.Lal

Sr Stenographer

Sri R. Ravidas

Assistant

Sri E. Haque

Sri A.K. Chaudhuri

Sri A. Haque

Sri R.B. Singh

Sri K.D. Pandey

Sri K.N. Sinha

Sri B. Ram

Sri Ravi Shankar

Sr Clerk

Sri S.Ram

Sri D. Ram

Sri D.N.Mahto

Smt. S. Guha

Sri K. L.Choudhuri

Sri R.K.Upadhyaya

Sri N.Topno

Sri Md. Mubarak

Sri V. Ram

Sri E.Gari

Sri Subhash Chand

(on deputation)

Sri T. Minz

Jr Stenographer

Smt. S. Prasad

Jr Clerk

Sri N. Gope

Sri B.N.Gope

Sri A.Pandey

Sri P.Singh

Sri S.C.Lal

Sri R.N.Mahto

Sri B.Sahu

Sri W.Guria

Sri K.P.Arya

Sri P. Kumar

Sri A. Gope

Sri A.K. Tripathi

Sri R.K. Toppo

Sri K.K. Deonath

Technical and Monitoring Cell**Sr Technical Officer**

Sri S.K.M. Tripathi (T-8)

Technical Officer

Sri R. Prasad (T-5)

Library**Technical Officer**

Sri R.P. Tewari (T-5)

Library Assistant

Sri V.K. Singh (T-4)

Maintenance and Workshop Unit**Maintenance Engineer**

Sri Hans Raj (T-6)

Sr Mechanic

Sri S.K. Bhaduri (T-4)

Instrument Mechanic

Sri H.L. Bhakta (T-1)

Medical Unit**Authorised Medical Attendent**

(Part time)

Dr N.P. Sahu

Stockman-cum-Compounder

Sri C. Pandey (T-1-3)

Farm Unit**Farm Superintendent**

Sri N.K. Sharma (T-6)

Field/Farm Technician

Sri Md. A. Ansari (T-II-3)

Sri R.C. Singh (T-I-3)

Sri V.K. Tewari (T-2)

Tractor Driver

Sri M. Surin (T-1-3)

Hindi Cell**Assistant Director (O.L.)**

Sri Lakshmi Kant

Hindi Translator (Auxiliary)

Sri Anjesh Kumar

Transport**Driver**

Sri J. Tiwari

Sri N. Lakra

Sri A. Kumar

ii) **Category-wise breakup of number of employees and the number of Scheduled Castes and Scheduled Tribes amongst them as on 31.3.1993**

Class of post	No. of posts Sanctioned	No. of Employees in position	No. of SC Employees	No. of ST Employees
Scientific				
R.M.P. Scientist	1	-	-	-
Principal Scientist, Sr.Scientist,Scientist(SG), Scientist(Sr. Sc.),Scientist	60	31	2	-
	-			
	61	31	2	-
Technical				
Category III	4	3	-	-
Category II	36	25	2	2
Category I	46	40	4	6
	86	68	6	8
Administrative				
Administrative Officer	1	1	-	-
Finance & Accounts Officer	1	1	-	-
Asst Admin. Officer	1	1	-	1
Asst Director (O.L.)	1	1	-	-
Superintendent	3	3	1	-
Sr Stenographer	1	1	1	-
Jr Stenographer	4	3	1	1
Assistant	8	8	1	-
Sr Clerk	13	12	1	4
Jr Clerk	16	14	1	3
	49	45	6	9
Supporting				
Grade IV	11	7	2	1
Grade III	18	17	4	7
Grade II	36	33	4	15
Grade I	71	46	5	22
	136	103	15	45
Auxiliary				
Auxiliary	14	5	1	1
Grand Total	346	252	30	63

iii) Promotions, appointments, transfers etc. during the period under report.

Appointments	Designation	Date of joining
Sri Subash Chand	Sr Clerk (on deputation from NDRI Karnal)	21.5.92
Sri Shyam Narayan	Admin. Officer	17.6.92
Sri Anjesh Kumar	Hindi Translator (on transfer basis from CRRI, Cuttack)	1.7.92
Sri Hans Raj	Mech. Engineer (T-6)	17.8.92
Sri Pranay Kumar	Jr Clerk (on compassionate grounds)	7.12.92
Sri Arun Kr. Tripathi	Jr Clerk	3.3.93
Sri Arjun Gope	Jr Clerk	4.3.93
Sri Radha Kishan Toppo	Jr Clerk	4.3.93
Sri Krishna Kanyal Deonath	Jr Clerk	5.3.93
Promotions	Designation	w.e.f
Sri Phekuwa Munda, Beldar	SG-III to SG IV	1.4.92
Sri Lakhna Naik, Beldar	SG III to SG IV	1.4.92
Sri R.G. Singh, Lab. Attdt.	SG II to SG III	1.4.92
Sri Hari Ram, Lab. Attdt.	SG II to SG III	1.4.92
Sri Nanku Oroan, Beldar	SG II to SG III	1.4.92
Sri Mahadeo Oroan	SG II to SG III	1.4.92
Sri R.B. Ram, <i>Safaiwala</i>	SG II to SG III	1.4.92
Sri Chaitu Kachhap, Lab. <i>Faras</i>	SG I to SG II	1.4.92
Sri R.K. Rai, Lab. Attdt.	SG I to SG II	1.4.92
Sri Ganesh Ram, <i>Safaiwala</i>	SG I to SG II	1.4.92
Sri M.L. Rabidas	T-1-3 to T-II-3	8.6.92
Sri Bhola Ram	T-1-3 to T-II-3	8.6.92
Sri D. Runda	T-1-3 to T-II-3	3.6.92
Sri Md. Ali Ansari	T-1-3 to T-II-3	8.6.92
Sri Ram Gulam Singh	SG II to T-1	8.6.92
Sri Hiranmoy Das	SG III to T-1	8.6.92
Sri Thibu Minz	Jr. Clerk to Sr. Clerk	18.2.93
Retirements	Designation	w.e.f
Sri B.N. Sah	Scientist	31.1.93
Sri D. Runda	T-II-3	31.8.92

METEOROLOGICAL DATA

Month	Mean Barometric pressure (mm)	Mean Maximum temp. (°C)	Mean Minimum temp. (°C)	Mean dry bulb temp. (°C)	Mean wet bulb temp. (°C)	Mean humidity (%)	Total rainfall temp. (mm)	Highest maximum temp. (°C)	Lowest minimum temp. (°C)
1992									
April	703.25	36.25	18.70	25.14	20.78	66.83	10.0	40.0	25.5
May	701.88	36.82	20.04	27.16	23.88	75.87	86.0	41.0	17.2
June	701.90	33.20	21.70	25.73	24.51	90.36	171.5	37.0	20.0
July	702.01	31.61	21.98	26.36	25.20	91.22	304.1	36.0	20.5
August	701.61	30.41	21.76	24.84	23.92	92.77	266.2	33.0	21.1
September	701.65	31.30	22.19	25.85	24.58	89.76	107.4	32.5	21.6
October	701.96	30.64	17.58	25.09	23.69	88.67	19.8	32.0	13.8
November	703.31	29.18	12.54	21.86	18.78	74.33	4.0	31.0	8.3
December	706.80	26.03	7.17	17.24	14.23	71.32	-	27.5	5.0
1993									
January	706.98	25.83	6.63	16.10	12.89	68.61	1.0	28.5	4.4
February	703.21	29.51	12.21	21.97	18.05	68.17	1.2	33.5	9.4
March	703.06	31.43	14.59	24.63	20.18	66.32	19.8	33.0	11.1

The highest temperature : 41.0°C (11.5.92)
 The lowest temperature : 4.4°C (20.1.93)
 Total rainfall : 991.0 mm
 Monsoon rainfall (June-Sept) : 849.2 mm
 Hailstorm : None

भारतीय लाख अनुसंधान संस्थान, नामकुम : राँची वार्षिक प्रतिवेदन - 1992-93

परिचय

भारत में लाख उद्योग की स्थिति की जांच एवं इसके बहुमुखी सुधार के लिए भारत सरकार द्वारा गठित जांच समिति की अनुशंसा के फलस्वरूप भारतीय लाख अनुसंधान संस्थान की स्थापना की गई। उक्त समिति के सुझावों के कार्यान्वयन हेतु लाख उद्योग से जुड़े लोगों ने "इन्डियन लैक एसोशिएसन फॉर रिसर्च" नामक एक गैरसरकारी संस्था का गठन किया तथा उसे पंजीकृत कराया। इस एसोशिएसन ने 1925 में भा. ला. अनुसंधान संस्थान की स्थापना की। सन् 1931 में भारत सरकार ने भारतीय लाख कर समिति का गठन किया जिसने इस संस्थान का अधिग्रहण कर लिया। अप्रैल 1966 से भारतीय लाखकर समाप्त कर दी गई तथा भारतीय लाख अनुसंधान संस्थान, भारतीय कृषि अनुसंधान परिषद् के प्रशासकीय नियंत्रण में आ गया। यह संस्थान कुल 49 हे. क्षेत्र में फैला हुआ है जिसमें संस्थान के दो परिसर तथा 36.5 हे. क्षेत्र का एक बागान शामिल है। मुख्य परिसर में कीट विज्ञान विभाग, रसायन विभाग, पादप विज्ञान अनुभाग, प्रसार विभाग की प्रयोगशालाओं के अतिरिक्त प्रशासकीय, वित्त एवं लेखा, पुस्कालय, यान्त्रिकी अनुभाग तथा आवासगृह के भवन स्थित हैं। प्रौद्योगिकी परिसर में प्रौद्योगिकी अनुभाग की प्रयोगशालाएं प्रशिक्षु छात्रावास तथा आवासीय भवन हैं।

संस्थान के अन्तर्गत एक क्षेत्रीय लाख अनुसंधान केन्द्र भी कार्य कर रहा है जो मध्य प्रदेश के धर्मजयगढ़ नामक स्थान पर स्थित है तथा राँची जिले के कुछ ग्रामों में एक सक्रियात्मक अनुसंधान परियोजना भी चलायी जा रही है।

भारतीय लाख अनुसंधान संस्थान लाख की खेती, परिष्करण एवं उपयोग संबंधी अनुसंधान में कार्यरत एक अग्रणी संस्था है। लाख की खेती अधिकांशतः बिहार एवं इसके निकटवर्ती राज्यों के जनजातियों द्वारा लगभग 80,900 वर्ग कि.मी. क्षेत्र में की जाती है। अपने स्थापना काल से ही संस्थान लाख के उत्पादन तथा उपयोगिता में वृद्धि हेतु उपयुक्त प्रौद्योगिकी के विकास एवं प्रसार में सतत प्रयत्नशील रहा है तथा अनेक प्रविधियाँ एवं उत्पाद विकसित किये गये हैं। उद्योगों की बदलती आवश्यकताओं को ध्यान में रखते हुए नये क्षेत्रों की खोज के लिए प्रयास जारी हैं। लाख की खेती एवं उपयोग के क्षेत्र में अनुसंधान कार्य के लिए भा.ला. अनु. सं. अन्तर्राष्ट्रीय ख्याति अर्जित कर चुका है।

उद्देश्य

संस्थान के मुख्य उद्देश्य निम्नवत हैं :-

लाख के उत्पादन, शुद्धिकरण एवं मानकीकरण के क्षेत्र में सुधार लाने हेतु अनुसंधान कार्य करना तथा लाख की रासायनिक संरचना का अध्ययन एवं इसके

गुणों में आवश्यक सुधार लाना ताकि लाख के उत्पादन एवं उपयोगिता के क्षेत्रों में वृद्धि की जा सके। अनुसंधान की उपलब्धियों का प्रचार एवं प्रसार करना तथा लाख उत्पादकों एवं उद्योगों से संपर्क रखते हुए उन्हें तकनीकी सेवा उपलब्ध कराना जिससे कि लाख के उत्पादन एवं उपयोगिता में सुधार लाया जा सके।

लाख की खेती के उन्नत विधियों तथा लाख के औद्योगिक उपयोगों के संबन्ध में प्रशिक्षण प्रदान करना।

संगठनात्मक व्यवस्था

संस्थान के शीर्ष अधिकारी निदेशक

होते हैं। अनुसंधान कार्य के लिए संस्थान में तीन विभाग-कीट विज्ञान विभाग, रसायन विभाग तथा प्रसार विभाग एवं दो अनुभाग प्रौद्योगिकी अनुभाग तथा पादप विज्ञान अनुभाग हैं। तकनीकी सहयोग हेतु पुस्तकालय, अनुरक्षण एवं कार्मशाला अनुभाग, बागान प्रबन्धन और तकनीकी एवं मॉनीटरिंग ईकाई कार्यरत हैं। प्रशासनिक खण्ड में प्रशासकीय अनुभाग, वित्त व लेखा अनुभाग और केन्द्रीय भण्डार हैं। सहायक इकाईयों के अन्तर्गत सुरक्षा, चिकित्सा और सम्पदा अनुरक्षण सेवाएँ हैं।

स्टाफ एवं बजट

संस्थान में 61 वैज्ञानिक, 86 तकनीकी, 49 प्रशासकीय, 14 सहायक तथा 136 चतुर्थवर्गीय स्वीकृत पद हैं।

वर्ष 1992-93 की अवधि में गैरयोजना मद में अनुमानित बजट रु. 120.00 लाख था, किन्तु वास्तविक खर्च रु. 129.59 लाख हुआ। योजनामद के अनुमानित बजट रु. 46.00 लाख में से वास्तविक खर्च रु. 26.62 लाख हुआ।

अनुसंधान की मुख्य उपलब्धियाँ

उत्कृष्ट लाख कीट का प्रजनन

भारतीय लाख कीट के रंगीनी प्रजाति से क्रीम रंग का भिन्न जेनेटिक लाख कीट प्राप्त हुआ, जिससे हल्के रंग का राल प्राप्त किया गया। इस लाख कीट से हल्के रंग की राल उत्पन्न करने वाले कीट के प्रजनन की आशा है।

लाख परभक्षी का कृत्रिम पालन

लाख के प्रमुख परभक्षी होल्कोसेरा पलवेरिया को कृत्रिम भोजन पर सफलता पूर्वक पाला गया। प्रभावी नियंत्रण विधि विकसित करने हेतु प्रयोगशाला-अध्ययन में इससे सहायता मिलेगी।

आकाशमणि-शीघ्र बढ़नेवाला लाख पोषक वृक्ष

लाख की खेती के लिए बहुतलीय प्रणाली के विकास हेतु विभिन्न लाख परिपालकों में आकाशमणि (अकेशिया एरिकुलिफामिस) शीघ्र बढ़ने वाला परिपालक पाया गया।

तिलचट्टा नियंत्रण के लिए बहुस्तरीय कीटनाशी पद्धति

लाख से एल्यूरीटिक अम्ल बनाने के बाद जो लसीला पदार्थ मिलता है, उसको

तिलचट्टा (कोक्रोच) नियंत्रण हेतु बहुस्तरीय कीटनाशी पद्धति विकसित करने के उपयोग में लाया जा सकता है।

चपड़ा-पॉली विनाइल एसीटल संमिश्रण पर आधारित-विद्युतरोधी वार्निश

चपड़ा एवं पालिविनायल एसीटल राल के घोलों के विभिन्न संमिश्रणों के परावैद्युत (डाइलैक्ट्रीक) गुणों से ज्ञात हुआ कि दोनों राल आपस में घुलमिल जाते हैं तथा समान अनुपात में इनके संमिश्रण को हवा में सुखनेवाला विद्युतरोधी वार्निश के रूप में उपयोग किया जा सकता है, क्योंकि इसमें बेहतर परावैद्युत शक्ति (68 के.भी/मि.मी.) है एवं आई एस : 10026 - 1982 के अनुसार जाँच करने पर अनुवर्तन (ट्रेकिंग) प्रतिरोध में वृद्धि पायी गई।

लाख आधारित उष्मागलित आसंजक

कार्टून एवं कागज के सतह को जोड़ने/साटने के लिए लाख और जलाशित लाख से एक उष्मा गलित आसंजक तैयार

किया गया जिसकी बंधन क्षमता 0.4 टन प्रतिवर्ग इंच है।

लाख के रंग की प्राप्ति का सरल उपाय

लाख घोवन जल से लाख के रंग की प्राप्ति की विधि में एक चरण कम करके इसे सरल बनाया गया है, तथा इससे उत्पादन मूल्य भी कम होता है।

प्रसार विशिष्टता

विभिन्न सरकारी/निजी संस्थाओं एवं उद्यमों द्वारा प्रेषित 500 से भी अधिक व्यक्तियों को लाख की खेती प्रक्रिया एवं उपयोग पर कई अल्पकालिक एवं दीर्घकालिक प्रशिक्षण दिए गये।

बिहार सरकार के वन विभाग को तकनीकी जानकारी प्रदान कर कुन्दरी में बड़े पैमाने पर लाख की खेती की गई जिसके परिणामस्वरूप नवम्बर दिसम्बर माह में करीब 80 क्वींटल बीहन लाख पैदा हुआ। इसके लिए स्थानीय जनजाति एवं अन्य वर्ग के कर्मियों को 2566 मानव दिवस कार्य पर लगाया गया।

विभिन्न विभागों/अनुभागों में किए गए अनुसंधान के सारांश

कीट विज्ञान विभाग

क्रियमाण अनुसंधान

- 1.1.9 तकनीकी कार्यक्रम के अनुसार कुसुम के वृक्षों की कटाई-छँटाई की गई। बीहन लाख की कमी के कारण लाख की खेती में वांछित प्रगति नहीं हो सकी।
- 1.1.10 क्षेत्र परीक्षणों से पता चला कि फरवरी, जुलाई एवं अक्टूबर महीने आकाशमणि के छँटाई के लिए उपयुक्त हैं। प्ररोहों में लगाने के लिए अनुकूलतम बीहन लाख का परिमाण एवं प्ररोहों की आयु क्रमशः 10-20 ग्रा./मीटर प्ररोह की लम्बाई एवं आयु 18 महीने देखी गयी।
- 1.2.5 भालिया एवं गलवांग पर लिए गए रंगीनी एवं कुसुमी लाख कीटों के गुणों पर नाइट्रोजन, फॉस्फेट एवं पोटैश का अलग से एवं सभी संभव मिश्रणों के साथ मिट्टी में प्रयोग कर उनके प्रभाव का अध्ययन किया गया।
- 1.4.17 भालिया की झाड़ियों से प्राप्त 1992-93 वैशाखी फसल में सूक्ष्मजैवीय रोगों से लाख कीट मरते नहीं देखा गया।
- 1.4.18 पौधों से प्राप्त कीटनाशी आर.डी.9, रेपेलीन, निमार्क एवं नीमगार्ड लाख परभक्षी यूवलीमा एमाविलीस के अण्डों के स्फुटन को रोकती है। डाइप्लूबैजूरान (0.05%) का अलग से तथा उपरोक्त में से

किसी एक कीटनाशी के समिश्रण के प्रयोग से लाख परभक्षियों में उल्लेखनीय दमन देखा गया।

- 1.4.19 लाख की खेती के लिए अनुशंसित समेकित नाशीकीट नियंत्रण कार्यक्रम में कुन्दरी के लाख बगान में पलास पर क्षेत्र परीक्षण किया गया। संचारण के पूर्व बी.एच.सी. (0.05%) का प्रयोग एवं बीहन लाख को थायोडॉन (0.05%) में डूबाकर नाशीकीट की रोकथाम करना प्रभावी रहा, परिणाम स्वरूप लाख की अच्छी उपज हुई।
- 1.5.8 विभिन्न क्षेत्रों के आठ लाख कीट स्टॉकों का रख-रखाव किया गया।
- 1.5.13 रंगीनी कुसुमी क्रास के एफ-6 पीढ़ी के जीवन काल का फैलाव अत्यधिक पाया गया। नये क्रीम रंग के कीट के रूपभेद के साथ पीले उत्पत्तिवर्ती (म्यूटेन्ट) के क्रास के अध्ययन से संकेत मिला कि क्रीम समलक्षणी का जीन वन समलक्षणी के लिए युग्म विकल्पी (एलील) तथा पीले जीन के लिए युग्मविकल्पी नहीं है।

तदर्थ अध्ययन

- लाख से जुड़े कीटों का कुछ रंगों के प्रति आकर्षण में अन्तर पाया गया। सामान्यतः प्राकृतिक प्रकाश के प्रति आकर्षण का स्तर अधिकतम पाया गया।
- एक महत्वपूर्ण लाख परभक्षी होल्कोसेरा पल्वेरिया को कृत्रिम भोजन पर वयस्क होने तक पाला गया।

पादप विज्ञान अनुभाग

क्रियमाण अनुसंधान

2.1.9 स्फैग्नम मोस + लेनोलीन पेस्ट एवं विभिन्न हॉर्मोनो को मूलोत्पत्ति पद्धति के रूप में उपयोग करते हुए कुसुम का गुंठी बांधा गया। आई.ए.ए. (100 पी.पी.एम), आई.बी.ए. (100 पी.पी.एम) एन.ए.ए. (50 पी.पी.एम.) आई. ए.ए. + एन.ए.ए. (100 पी.पी.एम), आई.वी.ए. + एन. ए.ए. (100 पी.पी.एम.) या आई.बी.ए. + आई.पी.ए. (50 पी.पी.एम) के प्रयोग से शत प्रतिशत मूलोत्पत्ति देखी गई।

2.1.11 पौधे को लगाने के तीन वर्ष के बाद विभिन्न लाख परिपालकों के वृद्धि गुणों का अध्ययन किया गया। आकाशमणि में अधिकतम वृद्धि देखी गई, उनके बाद गलवांग का स्थान रहा। पूर्ववर्ती वर्षों की तुलना में प्रतिशत वृद्धि कुसुम में अधिक थी।

2.1.12 उर्वरक एवं कोपिसिंग की ऊँचाई के प्रभाव के अध्ययन के लिए कुसरुन्त (एफ.स्ट्रोबीलीफेरा) के पौधों को उगाया गया।

2.2.6 भालिया के आनुवंशिक विभिन्नता के अध्ययन से लार्वा की मरणशीलता एवं लाख कीट के घनत्व में क्रमशः 32.96% एवं 31.72% वंशाणुतित्व देखी गयी।

2.2.7 तीन मोघनिया प्रजातियों एवं एम मैक्रोफाइला कौल्बीप्लॉइड का पौध वृद्धि गुण तथा इनके उपर लगे

लाख की फसल के आर्थिक गुणों का अध्ययन किया गया। लाख की उपज एवं पौध गुणों की दृष्टि से एम. पैनीकुलाटा सबसे अच्छा पाया गया।

रसायन विज्ञान विभाग

क्रियमाण अनुसंधान

3.2.10 रूपान्तरित प्रति क्रिया क्रम द्वारा 9 (जेड) हेक्साडेसीन 1-इल एसीटेट तैयार किया गया। प्रतिक्रिया की विधि को मानकीकृत किया गया। मिथाइल 9(जेड) -टे ट्राडेसीनोएट 9 (जेड)- टे ट्राडेसीन-1-ऑल एवं 9 (जेड) - टे- ट्राडेसी -1- ईल एसीटेट भी अधिक मात्रा में तैयार किया गया।

3.2.12 जलारिक अम्ल से लगभग 15 प्रतिशत उपज तक प्रतिस्थापित कुमेरीन डेरिवेटिव को संश्लेषित किया गया। अन्तिम उत्पाद एवं मध्यवर्ती यौगिक के कुछ लक्षणों को निर्धारित किया गया।

3.2.14 6-किटो मिरीस्टीक अम्ल को प्राप्त करने के लिए ब्यूटोलीक अम्ल जोन्स की विधि से आक्सीकरण कराया गया।

3.2.15 एक निजी फर्म से प्राप्त आइसोएम्ब्रेटोलाइड के नमूने को संस्थान में बनाए गए आइसोएम्ब्रेटोलाइड से तुलना की गई। दोनों नमूनों से समरूप "आर एफ" मान के साथ एकल स्पॉट प्राप्त हुआ। 9, 10 डाइहाई ड्रौक्सी हेक्साडेकेन - 1, 16

डायोइक अम्ल (एल्यूरीटीक अम्ल से प्राप्त) सेथेप्सीक अम्ल (हिम्साडेकेन -1, 16 डायोइक अम्ल) तैयार किया गया।

3.4.7 एल्यूरीटीक अम्ल की तैयारी के दौरान प्राप्त लसीला पदार्थ को 20% बायोमाइन एवं 2% कोबाल्ट नेफथोनेट के साथ रूपान्तरित किया गया एवं यह वेकिंग वार्निश जैसा उपयुक्त पाया गया। उपरोक्त लसीला पदार्थ को 40% बायोमाइन एवं 2% पारा टौल्यून सल्फोनिक अम्ल के साथ रूपान्तरित किया गया एवं यह हवा में सुखने वाला वार्निश की तरह उपयुक्त पाया गया।

3.4.8 चपड़ा- मेलेइक एनहाइड्राइड ग्लाइकॉल से तैयार पौलिएस्टर को विभिन्न आइसोसाएनेट्स से प्रतिक्रिया कराई गई। डेस्मोडूर एन से प्राप्त चपड़ा यूरेथेन पेंट को बाहर में प्रयोग करने एवं जाँच करने पर आठ महीने तक अप्रभावित पाया गया।

3.5.6 तिलचट्टा नियंत्रण के लिए एल्यूरीटीक अम्ल- वर्जित लसीला जलांशित लाख मंद निर्मुक्ति बहुस्तरीय पद्धति के लिए आघात्री के रूप में प्रयोग की संभावना देखी गयी।

लाख आधारित कीटनाशी "मोनोलीथ" तैयार करने के लिए भी अध्ययन किया गया। यह देखा गया कि इसमें विरंजित लाख की उपस्थिति कीटनाशी की सक्रियता को कम करती है।

3.6.5 चपड़े एवं दो तरह के पौलीविनाइल एसीटल राल (सिनपॉल बी-30 एवं बी-72) के समिश्रण के परावैद्युत गुणों का अलग-अलग अध्ययन किया गया। पृथक बहुलक एवं चपड़ा के साथ उसके कुछ समिश्रण की परावैद्युत शक्ति तथा अनुवर्तन सूचक मान चपड़े से बेहतर पाई गई।

तदर्थ अध्ययन

एल्यूरीटीक अम्ल के परआयोडेट आक्सीकरण द्वारा एजेलिक सेमीएल्लिहाइड प्राप्त किया गया। एसीटल प्राप्त करने के लिए पी.टी.एस. अम्ल की उपस्थिति में इथीलीन ग्लाइकोल का उपयोग कर सेमी एल्लिहाइड को एसीटलीकृत किया गया एवं उसे कॉलम क्रोमैटोग्राफी द्वारा शुद्ध किया गया। मेथानोल से मोमरहित चपड़े को प्रतिक्रिया कराकर एवं हाइड्रोक्लोरिक अम्ल को उत्प्रेरक के रूप में प्रयोग कर मिथाइल इस्टर तैयार किया गया।

प्रौद्योगिकी अनुभाग

क्रियमाण अनुसंधान

4.3.7 सामान्य चपड़ा की बन्धन शक्ति 0.12 टन प्रति वर्ग इंच की तुलना में चपड़ा एवं जलांशित लाख (40:60) पर आधारित उष्मागलित आसंजक यौगिक की बंधन शक्ति 0.40 टन प्रति वर्ग इंच पायी गयी।

4.4.3 लाख के रंग की निष्कासन की प्रक्रिया को एक चरण कम कर मानकीकृत किया गया।

तदर्थ अध्ययन

- कुसुमी चोरी लाख के घोल से मोम निकालने के तहत घोल के तापमान को घटाकर 8-10° से. करने से मोमरहित रंगहीन लाख (मोम का परिमाण 0.1%) तैयार करना संभव हुआ।

प्रसार विभाग

क्रियमाण अनुसंधान

- 5.5 राँची जिले के नामकुम प्रखण्ड के चितौर एवं डूंडु ग्रामों में किसानों के पलास एवं बेर के वृक्षों पर लाख की खेती के उन्नत प्रौद्योगिकी का परीक्षण-सह-प्रदर्शन किया गया। ग्रामीण पद्धति की तुलना में इसमें बीहन लाख की उपज (लगभग सात गुणा) तथा कच्ची लाख की उपज (लगभग पांच गुणा) में वृद्धि पायी गई। क्षेत्र के किसानों के बीच लाख परिपालक पौधों के बिचड़े भी वितरित किए गए।

उन्नत किस्म के बागवानी फसलों को उगाने के लिए प्रोत्साहित किया गया। गेहूँ (सोनालिका) एवं गन्ना धान के प्रदर्शन की भी व्यवस्था की गई।

तदर्थ अध्ययन

- प्रतिक्रमण विश्लेषण द्वारा आर्थिक गुणों का उपयोग करते हुए कच्ची लाख की उपज के अनुमान की संभावना संबंधी अनुसंधान किये गये। पश्चायित उपज एवं थाइलैक उत्पादन पर आधारित मोडेल द्वारा लाख के उपज की

भविष्यवाणी करना उपयुक्त पाया गया। पिछले साठ वर्ष के लाख के उत्पादन में उतार चढ़ाव के पहलू का अध्ययन किया गया।

आयोजित संगोष्ठी, परिसंवाद इत्यादि

कृषि समिति के एक अध्ययन दल ने श्री सोमपाल, सांसद की अध्यक्षता में श्री राम टहल चौधरी, सांसद श्री भोगेन्द्र नाथ झा सांसद, श्री उपेन्द्र नाथ वर्मा, सांसद एवं डॉ. टी.पी. ओझा, उप महानिदेशक (अभियांत्रिकी), भारतीय कृषि अनुसंधान परिषद तथा लोकसभा सचिवालय के अधिकारियों के साथ भारतीय लाख अनुसंधान संस्थान, केन्द्रीय बागवानी परीक्षण केन्द्र, राँची, (भारतीय बागवानी अनुसंधान संस्थान, बेंगलोर) एवं बिरसा कृषि विश्वविद्यालय की गतिविधियों की समीक्षा के लिए राँची का दौरा किया।

दिनांक-2.6.1992 को होटल अशोक, राँची में एक बैठक आयोजित की गई जिसमें डॉ. हरेराज मिश्रा, उपकुलपति, बिरसा कृषि विश्वविद्यालय, श्री श्रवण कुमार, निदेशक, भारतीय लाख अनुसंधान संस्थान, डॉ. धर्मपाल सिंह, प्रधान, केन्द्रीय बागवानी परीक्षण केन्द्र, राँची ने अपने-अपने संस्थान/केन्द्र की उपलब्धियों एवं गतिविधियों की जानकारी प्रस्तुत की तथा समिति के माननीय सदस्यों के प्रश्नों के उत्तर दिये।

श्री एम. लाल, संयुक्त आयुक्त (कृषि), श्री पी.के. दीक्षित, अतिरिक्त आयुक्त (कृषि), उपरोक्त संस्थानों के विभागीय प्रमुखों एवं राज्य सरकार के अधिकारियों ने भी उक्त बैठक में भाग लिया।

दूसरे दिन भारतीय लाख अनुसंधान संस्थान में समिति का आगमन हुआ। सदस्यों को संस्थान की अनुसंधान गतिविधियों से अवगत कराने हेतु संग्रहालय दिखाया गया। समिति के माननीय सदस्यों ने संस्थान के बागान में लाख परिपालक वृक्षों के पौधे लगाए।

सहायक/सपोर्टिंग सेवा

पुस्तकालय

पुस्तकालय द्वारा संस्थान के वैज्ञानिकों के अतिरिक्त बिरसा प्रौद्योगिकी संस्थान रांची, रांची विश्वविद्यालय, रांची, भारतीय प्रौद्योगिकी संस्थान खड़गपुर, राष्ट्रीय धातुकर्म प्रयोगशाला, जमशेदपुर, पटना विश्वविद्यालय, पटना एवं बिहार विश्वविद्यालय, मुजफ्फरपुर जैसे संस्थानों के शोध छात्रों, प्राध्यापकों एवं शोधकर्मियों को वैज्ञानिक साहित्य उपलब्ध कराई गई तथा परामर्शदात्री सेवा दी गई।

पुस्तकालय की होल्डिंग का विस्तृत विवरण निम्नवत है :

दस्तावेज	इस अवधि में वृद्धि	कुल
पुस्तकें, जिल्दलगी सामग्री	308	20,819
वार्षिक रिपोर्ट	121	1940
रिप्रिन्ट फोटो प्रतियाँ	10	220
बुलेटीन, अनुसंधान पत्रक	-	501

इस वर्ष पत्रिकाओं एवं अन्य प्रकाशनों के उपार्जन पर 6.12 लाख रुपये खर्च किये गए। गुड ऑफिसेस समिति, नई दिल्ली एवं भारतीय कृषि अनुसंधान परिषद से प्राप्त निर्देशों के आधार पर पुस्तकों एवं पत्रिकाओं का उपार्जन किया गया।

अधिकांश पत्रिकाएं एवं पुस्तकें सीधे प्रकाशकों से क्रय की गईं।

संस्थान में कार्यरत वैज्ञानिकों को भविष्य में आयोजित होने वाले सम्मेलनों/संगोष्ठियों से अवगत कराने के लिए सूची तैयार कर परिचालित किया गया। अब तक इसी सूची के 6 अंक तैयार कर परिचालित किये जा चुके हैं।

पुस्तकालय ने स्वदेश एवं विदेशों के अनेक वैज्ञानिक पुस्तकालयों से भारतीय लाख अनुसंधान संस्थान के प्रकाशनों के साथ विनिमय किया है।

पुस्तकालय द्वारा उपार्जित किये गए प्रकाशनों का विवरण :

विवरण	राष्ट्रीय	अन्तर्राष्ट्रीय
सशुल्क पत्रिकाओं की संख्या	60	30
विनिमय या मानार्थ प्राप्त पत्रिकाओं की संख्या	32	14
संस्थान पुस्तकालय से विनिमय	-	-
संबंध रखने अनुसंधान संस्थानों/सूचना केन्द्रों की संख्या	102	17

संस्थान पुस्तकालय भारत में विज्ञान एवं प्रौद्योगिकी के राष्ट्रीय होल्डिंग नेटवर्क के लिए आइ.एन.एस.डी.ओ.सी., नई दिल्ली द्वारा प्रायोजित एक परियोजना एन यू सी एस एस आई (नेशनल यूनियन कैटेलॉग ऑफ साइंटिफिक सिरिज इन इंडिया) का अंशदाता सदस्य है।

पुस्तकालय भारतीय संस्कृतिक संबंध परिषद् (आई. सी. सी. आर.) के माध्यम से ब्रिटिश लाइब्रेरी सेवा का एक संस्थागत सदस्य है एवं संस्थान के वैज्ञानिकों की सुविधा के लिए विनिमय सेवा का उपयोग कर रहा है।

सूचना के कम्प्यूटरीकृत संचयन एवं आसूचना प्रेषण के लिए डाट मैट्रिक्स प्रिन्टर के साथ डी. ओ. एस. 5.00 वर्सन का एक पी सी/ए टी 386 क्रय कर पुस्तकालय में स्थापित किया गया।

तकनीकी एवं परिवीक्षण प्रकोष्ठ

यह प्रकोष्ठ संस्थान के अनुसंधान गतिविधियों के लिए सेवायें उपलब्ध कराती है एवं क्रियमाण अनुसंधान परियोजनाओं की प्रगति की समीक्षा और प्रारम्भ होने वाले अनुसंधान परियोजनाओं की जाँच के लिए स्टाफ अनुसंधान परिषद की बैठक आयोजित करती है, तथा यहाँ परिचालन के लिए बैठक की कार्यवाही भी तैयार की जाती है। इसके अतिरिक्त यह अनुसंधान परियोजनाओं की संचिकाओं का रख रखाव करता है। विभिन्न अनुसंधान परियोजनाओं की उपलब्धियों को परिषद में भेजने के लिए संकलन किया गया है। विभिन्न रिपोर्टें जैसे मंत्रिमंडल के लिए मासिक रिपोर्ट, संकार्य अनुसंधान परियोजना के लिए तिमाही रिपोर्ट, कृषि अनुसंधान एवं शिक्षा विभाग की रिपोर्ट के लिए सामग्री एवं भारतीय कृषि अनुसंधान परिषद के लिए अनुसंधान उपलब्धियों को संकलित किया गया। यह प्रकोष्ठ अनुसंधान संबंधी लेखों के वैज्ञानिक एवं लोकप्रिय पत्रिकाओं में प्रकाशन के लिए सामग्री का अग्रसारण करता है।

राजभाषा एकक

कार्यालय के कार्यों में हिन्दी के प्रगामी प्रयोग के लिए भारत सरकार द्वारा तैयार किये गए वार्षिक कार्यक्रम एवं राजभाषा नीति के कार्यान्वयन के लिए तथा राजभाषा अधिनियम एवं नियमों

के संबंध में समय-समय पर भारतीय कृषि अनुसंधान परिषद से प्राप्त निर्देशों के अनुसार कार्य सम्पादन हेतु संस्थान में राजभाषा एकक का गठन किया गया है। इसमें एक सहायक निदेशक (रा.भा.) तथा एक हिन्दी अनुवादक कार्यरत हैं।

कार्यालय के दैनिक कार्यों में हिन्दी के प्रयोग में प्रगति, हिन्दी को लोकप्रिय बनाने के लक्ष्य की प्राप्ति एवं इसके बहुआयामी उपयोग के लिए राजभाषा एकक द्वारा निम्नलिखित कार्य किए जाते हैं।

1. संस्थान राजभाषा कार्यान्वयन समिति की बैठक का आयोजन, कार्यसूची एवं कार्यवृत्त की तैयारी तथा लिए गए निर्णयों पर अनुवर्ती कार्रवाई।
2. वार्षिक रिपोर्ट का सारांश, कार्यालय आदेश, परिपत्र, ज्ञापन, निविदा सूचना, कोटेशन इत्यादि का अनुवाद।
3. अहिन्दी भाषी अधिकारियों/कर्मचारियों को हिन्दी शिक्षण योजना द्वारा आयोजित हिन्दी प्रशिक्षण के लिए नामित करना।
4. हिन्दी दिवस, हिन्दी सप्ताह एवं हिन्दी प्रतियोगिताओं का आयोजन।
5. संदर्भ साहित्य, हिन्दी पत्रिकाएं, शब्दकोश एवं तकनीकी शब्दावलियों का उपार्जन।

फार्म एकक

संस्थान परिसर एवं बागान का प्रबन्धन तथा सामान्य रख रखाव किया गया। लाख परिपालकों के विभिन्न प्लाटों में गुड़ाई, खर पतवार तथा घास पात निकालना एवं जुताई इत्यादि कार्य कराए गए। विभिन्न लाख परिपालक प्रजातियों के प्लाटों में खाली स्थान को उपयुक्त

विचड़ों से भरा गया। अनुसंधान कार्य एवं फार्म की सुरक्षा से संबंधित, सिंचाई एवं परिवहन के लिए आवश्यक प्रबन्ध किये गये। संकार्य अनुसंधान परियोजना क्षेत्र में वितरण के लिए लाख परिपालक पौधों के विचड़े उगाए गए।

विभिन्न स्थानों के सुन्दरीकरण के लिए सजावटी एवं मौसमी फूलों को उगाया गया एवं प्रतिरोपित किया गया। कुसुम, बेर, पलास एवं खैर के पौधों पर प्रदर्शन के उद्देश्य से कुसुमी एवं रंगीनी फसल उगाए गए। फार्म के उत्पाद जैसे जलावन की लकड़ी, सजावटी पौधे इत्यादि की बिक्री से कुल 4,325 रु. अर्जित हुई।

अनुरक्षण एवं कर्मशाला

कर्मशाला सह अनुरक्षण एकक ने परिसर, प्रयोगशाला, स्टाफ क्वार्टर एवं फार्म इत्यादि में पानी एवं विद्युत आपूर्ति लाइनों का रख रखाव किया। फार्म एवं प्रयोगशाला के छोटे उपकरणों के छोटे मरम्मत एवं पार्ट्स के निर्माण का कार्य किया गया। विद्युत संबंधी 742, यांत्रिक एवं नलसाज संबंधी 232, उपकरण मरम्मत 310, बढ़ई का कार्य 230, वेल्डिंग इत्यादि के 193 कार्य सम्पन्न हुए।

कला एवं छायांकन

कला एवं छायांकन एकक ने अनुसंधान एवं प्रसार गतिविधियों में सहयोग किया। लाख कीटों एवं सम्बद्ध कीटों, लाख परिपालकों, अनुसंधान से जुड़े अन्य कीटों अनुसंधान से संबंधित सामग्रियों तथा संस्थान के विभिन्न आयोजनों की तस्वीरें ली गईं। लगभग 160 रंगीन तस्वीरें एवं 37 रंगीन स्लाइडें इनमें शामिल हैं।

स्वास्थ्य

संस्थान के कर्मचारियों एवं उनके आश्रितों की चिकित्सा परिचर्या के लिए सभी कार्य दिवसों को एक अंशकालिक प्राधिकृत चिकित्सक आते हैं। उनके कार्य में सहायता के लिए एक कंपाउण्डर सह भण्डारपाल एवं एक परिचर नियुक्त हैं। इस अवधि में भारतीय लाख अनुसंधान संस्थान औषधालय में 4828 मरीजों की जाँच की गई, 75 मरीजों को राजेन्द्र चिकित्सा महाविद्यालय राँची या विशेषज्ञों के पास इलाज के लिए भेजा गया इसके अतिरिक्त कर्मचारियों के चिकित्सा प्रतिपूर्ति विपत्रों पर कारवाई की गई।

विविध महत्वपूर्ण समितियाँ

प्रबंधन समिति

प्रबन्धन समिति संस्थान के विभिन्न अनुसंधान कार्यक्रमों के अधीन अनुसंधानों के प्रगति की अनुवीक्षण एवं नये अनुसंधानों इत्यादि में उपयुक्त संशोधन हेतु परामर्श देते हुए निदेशक के कार्यों में सहयोग करती है। यह अनुसंधान एवं प्रशासन से संबंधित समस्याओं के समाधान में भी मदद करती है। समिति वार्षिक एवं पंचवर्षीय योजनाओं के लिए प्रस्ताव की तैयारी में भी सहायता करती है।

समिति के संघटक सदस्य निम्नलिखित हैं :

- | | |
|--|---------|
| 1. श्री श्रवण कुमार, निदेशक | अध्यक्ष |
| भारतीय लाख अनुसंधान संस्थान,
नामकुम, राँची | |
| 2. डॉ. जी. सिंह | सदस्य |
| सहायक महानिदेशक (अभियांत्रिकी)
भारतीय कृषि अनुसंधान परिषद | |

- कृषि भवन, नई दिल्ली
3. अतिरिक्त मुख्य वन संरक्षक (लघु वन उत्पाद) प्रधान मुख्य वन संरक्षक का कार्यालय, भोपाल, मध्य प्रदेश सदस्य
4. डॉ. पी. के. सेन शर्मा, इमेरिटस वैज्ञानिक बंजर भूमि विकास केन्द्र, नार्थ-इस्टर्न हील, उत्तर पूर्वी पर्वतीय विश्व विद्यालय, शिलांग प्लेट न. - 1, दूसरा तल, वेस्ट ब्लॉक, 302 एन.एस.सी. बोस रोड, कलकत्ता सदस्य
5. श्रीमती वासन्ती देवी, पूर्व विधायिका बस स्टेण्ड के निकट, थेजार, जिला - रोहतक, हरियाणा सदस्य
6. श्री बलवीर सिंह बरताना, पूर्व विधायक प्लेट संख्या-329, सेक्टर-37ए चण्डीगढ़, पंजाब सदस्य
7. वित्त एवं लेखा अधिकारी, केन्द्रीय चावल अनुसंधान संस्थान, कटक
8. डॉ. प्रणय कुमार प्रधान वैज्ञानिक एवं अध्यक्ष पादप विज्ञान अनुभाग भारतीय लाख अनुसंधान संस्थान नामकुम, रांची सदस्य
9. श्री रमेश चन्द्र मिश्र वैज्ञानिक (प्रवरण कोटि) एवं अध्यक्ष प्रसार विभाग भारतीय लाख अनुसंधान संस्थान नामकुम, रांची सदस्य
10. डॉ. भरत प्रसाद सिंह वरीय वैज्ञानिक भारतीय लाख अनुसंधान संस्थान नामकुम, रांची सदस्य
11. डॉ. अगस्त पाण्डेय वरीय वैज्ञानिक भारतीय लाख अनुसंधान संस्थान नामकुम, रांची सदस्य
12. प्रशासकीय अधिकारी भारतीय लाख अनुसंधान संस्थान नामकुम, रांची सदस्य सचिव

प्रबन्धन समिति की 18वीं एवं 19वीं बैठक संस्थान में क्रमशः दिनांक 4 दिसम्बर 1992 एवं 13 मार्च 1993 को सम्पन्न हुई।

खेल-कूद

भारतीय कृषि अनुसंधान परिषद् क्षेत्रीय खेल-कूद प्रतियोगिता

वर्ष 1992-93 के लिए केन्द्रीय चावल अनुसंधान संस्थान, कटक में दिनांक 6.11.92 से 12.11.92 की अवधि में आयोजित क्षेत्रीय अन्तर-संस्थान खेल-कूद प्रतियोगिता में डॉ. निरंजन प्रसाद (वरीय वैज्ञानिक) चीफ-डी-मिशन, श्री अमर कुमार सहाय, टी-5 एवं श्री बैजनाथ गोप, कनीय लिपिक टीम मैनेजर सहित संस्थान के 45 प्रतियोगियों के दल ने भाग लिया।

दलीय स्पर्धा में संस्थान के श्री नव कुमार डे, श्री डेविड विलियम रुण्डा, डॉ. अजय भट्टाचार्य, श्री अमर कुमार सहाय एवं श्री हरिहर सिंह मुण्डा की बैडमिंटन टीम प्रतियोगिता की चैम्पियन हुई। व्यक्तिगत स्पर्धा में भी श्री नव कुमार डे को बैडमिंटन प्रतियोगिता की चैम्पियनशीप मिली। ट्रेक एवं फिल्ड स्पर्धा में 1500

मीटर की दौड़ में श्री डेविड विलियम रुण्डा को द्वितीय पुरस्कार प्राप्त हुआ।

भारतीय कृषि अनुसंधान परिषद् अन्तर क्षेत्रीय खेल-कूद प्रतियोगिता

हमारे संस्थान की बैडमिंटन टीम के सदस्यों श्री नव कुमार डे, श्री अमर कुमार सहाय (टीम मैनेजर), डॉ. अजय भट्टाचार्य, श्री डेविड विलियम रुण्डा एवं श्री दिलीप कुमार सिंह ने राष्ट्रीय मृदा सर्वेक्षण एवं भूमि उपयोग नियोजन ब्यूरो, नागपुर में दिनांक 28-31 मार्च 1993 की अवधि में आयोजित अन्तर क्षेत्रीय खेल कूद प्रतियोगिता में भाग लिया एवं दल ने उपविजेता का स्थान प्राप्त किया।

आगंतुक/दर्शक

संस्थान में देश एवं विदेशों से आगंतुक आते रहे। इस अवधि में संस्थान में छात्रों, अति महत्वपूर्ण व्यक्तियों, विदेशियों शिक्षाविदों, वैज्ञानिकों एवं अन्य लोगों का आगमन हुआ। कुछ विशिष्ट आगंतुकों के नाम निम्नवत हैं :

प्रो. आर. वाटनाबे, कृषि संकाय, चुओ विश्वविद्यालय, टोकियो, जापान

श्री एच. वाटनाबे, कृषि संकाय, क्योटो विश्वविद्यालय, क्योटो, जापान

श्री एच. सुजुकी, लाख व्यवसायी, टोकियो, जापान

श्री एम. सुजुकी एवं श्री एम. सवादा, लाख व्यवसायीगण, टोमेने केमिकल कम्पनी लिमिटेड, टोकियो, जापान

श्री टी. प्रसाद, प्रबन्ध निदेशक, बिहार स्टेट कोओपरेटिव लैक मार्केटिंग फेडरेशन, राँची

श्री उपेन्द्र नाथ वर्मा, सांसद, 34 औरंगजेब रोड, नई दिल्ली - 11

श्री टी.पी. ओझा, उपमहानिदेशक, (अभियांत्रिकी), भारतीय कृषि अनुसंधान परिषद, कृषि भवन, नई दिल्ली

श्री सोमपाल, सांसद, 28 लोदी इस्टेट, नई दिल्ली

श्री राम टहल चौधरी, सांसद, राँची

श्री भोगेन्द्र झा, सांसद, मधुबनी, बिहार

श्री के.पी. राव, महाप्रबन्धक सह क्षेत्रीय प्रबन्धक (पूर्वीक्षेत्र), ट्राइबल को-ओपरेटिव मार्केटिंग डेवलपमेंट फेडरेशन ऑफ इंडिया लिमिटेड, कलकत्ता

डॉ. एस. चीनामणि, सहायक उपमहानिदेशक (कृषि वानिकी) भा. कृ. अनु. परिषद कृषि भवन, नई दिल्ली

डॉ. जी. सिंह, सहायक उपमहानिदेशक (अभियांत्रिकी) भारतीय कृषि अनुसंधान परिषद, नई दिल्ली

डॉ. पी.के. सेनशर्मा (सदस्य, संस्थान प्रबन्धन समिति) डीन (अवकाश प्राप्त) बानिकी संकाय, बिरसा कृषि विश्वविद्यालय, कांके, राँची

श्री एम.के. सिन्हा, चीफ मैनेजर (डेव. एस.आई.बी.) भारतीय स्टेट बैंक आंचलिक कार्यालय, राँची

श्री सी.के. राय, चीफ मैनेजर, भारतीय स्टेट बैंक, हेड आफिस, पटना

श्री डी.जे. मित्रा, सामाजिक वानिकी अनुसंधान एवं मूल्यांकन प्रभाग, राँची

श्री एस.जी. उपाध्याय, क्षेत्रीय उपनिदेशक, एन.सी.डी.सी., पटना

श्री एम. लाल, संयुक्त आयुक्त, भारत सरकार

श्री बी.के. दीक्षित, अतिरिक्त आयुक्त, कृषि मंत्रालय

संस्थान राजभाषा कार्यान्वयन समिति - 1992-93

भारत सरकार की राजभाषा नीति के कार्यान्वयन, संस्थान के कर्मचारियों के लिए हिन्दी प्रशिक्षण, राजभाषा नियम - 1976 के प्रावधानों के अनुपालन एवं समय-समय पर निर्गत नियमों एवं प्रावधानों के लिए अनुवर्ती कारवाई तथा संस्थान के काम-काज में हिन्दी के प्रयोग को बढ़ावा देने एवं इस कार्य में आनेवाली समस्याओं के निराकरण हेतु संस्थान राजभाषा कार्यान्वयन समिति कार्यरत रही। समिति में निम्नलिखित सदस्य थे :

1. श्री श्रवण कुमार, निदेशक अध्यक्ष
2. डॉ. सतीश चन्द्र अग्रवाल, विभागाध्यक्ष सदस्य
3. श्री अंजार हुसैन नक्वी, विभागाध्यक्ष सदस्य
4. डॉ. प्रणय कुमार, अनुभागाध्यक्ष सदस्य
5. श्री प्रेमचन्द्र गुप्ता, अनुभागाध्यक्ष सदस्य
6. श्री रमेश चन्द्र मिश्र, विभागाध्यक्ष सदस्य
7. श्री श्रीकृष्ण मणि, त्रिपाठी, सदस्य
वरिष्ठ तकनीकी अधिकारी
8. श्री प्रदीप कुमार, वित्त एवं सदस्य
लेखा अधिकारी
9. श्री नरेन्द्र कुमार शर्मा, फार्म अधीक्षक सदस्य
10. श्री रामप्रताप तिवारी, पुस्तकालयाध्यक्ष सदस्य
11. श्री हरिहर सिंह मुंडा, सदस्य
सहायक प्रशासकीय अधिकारी
12. श्री लक्ष्मी कान्त, सदस्य
सहायक निदेशक (रा.भा.) सदस्य सचिव
समिति की बैठकों में सदस्यों ने

संस्थान के कामकाज में हिन्दी के प्रयोग को बढ़ावा देने के क्रम में हिन्दी कार्यशाला का आयोजन, विभागाध्यक्षों सहित विभाग/ अनुभाग के अन्य कर्मचारियों को अपने आवेदन इत्यादि मामलों को भी हिन्दी में ही लिखने हेतु प्रोत्साहित करने का निर्णय लिया। इन निर्णयों के परिणाम स्वरूप वेतन विपत्र हिन्दी में तैयार किया जाने लगा। कम्प्यूटरों के द्विभाषीकरण हेतु विचार विमर्श किया गया।

पिछड़ी जाति एवं जनजाति के लिए "लाख उत्पादन एवं शोधन" प्रशिक्षण" (दो सप्ताह की अवधि) एवं कृषक गृहिणी प्रशिक्षण कार्यक्रम (एक दिवसीय) 13 बैचों में कुल 369 प्रशिक्षार्थियों को हिन्दी माध्यम से प्रशिक्षित किया गया।

अन्य संदर्भ ग्रंथों के उपार्जन के साथ-साथ "अनुवाद" एवं "विज्ञान गंगा" हिन्दी त्रैमासिक पत्रिकाओं का उपार्जन किया गया।

"लाख शब्दावली" के संकलन हेतु संस्थान के सात वैज्ञानिकों वरिष्ठ तकनीकी अधिकारी, पुस्तकालयाध्यक्ष एवं सहायक निदेशक (राजभाषा) सहित 10 सदस्यों की एक समिति गठित की गयी।

रांची नगर राजभाषा कार्यान्वयन समिति की दिनांक 20 अगस्त 1992 को आयोजित बैठक में संस्थान के निदेशक श्री श्रवण कुमार एवं प्रभारी हिन्दी कार्यक्रम श्री श्रीकृष्ण मणि त्रिपाठी ने भाग लिया।

हिन्दी दिवस एवं हिन्दी सप्ताह (1992-93)

प्रत्येक वर्ष की भांति संस्थान में 14 सितम्बर 1992 को हिन्दी दिवस समारोह का आयोजन किया गया। इसी तिथि से हिन्दी सप्ताह भी आरंभ हुआ। हिन्दी दिवस समारोह के अवसर पर विविध सांस्कृतिक कार्यक्रमों का सफल आयोजन किया गया। कार्यक्रम का शुभारंभ स्वागत गान से हुआ संस्थान के कर्मचारियों ने हिन्दी गीत, भजन, प्रहसन एवं कविता पाठ का एक मनोरंजक कार्यक्रम प्रस्तुत किया।

समारोह के मुख्य अतिथि स्थानीय दैनिक समाचार पत्र "आज" के सम्पादक श्री चक्रवर्ती गणपति "नावड" ने कहा कि यह एक बड़ी विडम्बना है कि अपनी ही भाषा को प्रतिष्ठित करने के लिए "हिन्दी दिवस" जैसे समारोहों का आयोजन करना पड़ रहा है। उन्होंने कहा की हिन्दी हमारी राजभाषा एवं राष्ट्रभाषा ही नहीं बल्कि राष्ट्रीय एकता का प्रतीक है। इस अवसर पर श्री नावड ने संस्थान द्वारा प्रकाशित "लाख शब्दावली" का विमोचन किया।

संस्थान के निदेशक श्री श्रवण कुमार ने हिन्दी को किसी क्षेत्र या अंचल की भाषा नहीं बल्कि उसे राजभाषा एवं

राष्ट्रभाषा कहते हुए इसकी विशेषता बतलाई कि अहिन्दीभाषी भी थोड़े प्रयास से बड़ी सहजता से हिन्दी सीख सकते हैं क्योंकि इसमें पर्याप्त मात्रा में कई क्षेत्रीय बोलियों एवं भाषाओं के शब्द समाहित हैं।

सहायक निदेशक (राजभाषा) श्री लक्ष्मी कान्त ने संस्थान में हिन्दी की प्रगति की रिपोर्ट प्रस्तुत करते हुए बतलाया कि हिन्दी अनुभाग के प्रयास से दो हिन्दी-तत्पर वैज्ञानिकों को हिन्दी शिक्षण योजनाधीन हिन्दी में प्रशिक्षण दिलवाया गया। इन दो वैज्ञानिकों में से श्री इरुदय राजेन्द्रण की हिन्दी-हस्तलिपि तथा श्री रंगनातन रमणि के हिन्दी के प्रति स्वाभाविक लगाव की चर्चा की।

वरिष्ठ तकनीकी अधिकारी श्रीकृष्णमणि त्रिपाठी ने "सरकारी कामकाज में हिन्दी का प्रयोग उपलब्धियाँ एवं समस्याएँ" विषय पर सार गर्भित एवं रोचक व्याख्यान दिया।

समारोह का संचालन श्री अर्जुन कुमार सिन्हा तथा धन्यवाद ज्ञापन हिन्दी दिवस समारोह आयोजन समिति के अध्यक्ष श्री रंगनातन रमणि ने किया।



कार्यकर्ता वर्ग

दिनांक 31.3.93 को संस्थान में कार्यरत कार्यकर्ता

<p style="text-align: center;">निदेशक</p> <p style="text-align: center;">श्री श्रवण कुमार</p> <p>कीट विज्ञान विभाग विभागाध्यक्ष</p> <p>श्री अंजार हुसैन नक्वी</p> <p>वैज्ञानिक (प्रवरण कोटि)</p> <p>श्री रंगनातन रमणि (कृषि कीट विज्ञान)</p> <p>वैज्ञानिक</p> <p>श्री शालिग्राम चौधरी (कृषि कीट विज्ञान)</p> <p>डॉ. अजित कुमार सेन (कृषि कीट विज्ञान)</p> <p>डॉ. शंकर कुमार जयपुरियार (कृषि कीट विज्ञान)</p> <p>डॉ. अजय भट्टाचार्य (कृषि कीट विज्ञान)</p> <p>श्री यज्ञदत्त मिश्र (कृषि कीट विज्ञान)</p> <p>श्री महेश्वर लाल भगत (कृषि कीट विज्ञान)</p> <p>श्री केवल कृष्ण शर्मा (कृषि कीट विज्ञान)</p> <p>तकनीकी अधिकारी</p> <p>श्री अमर कुमार सहाय (टी-5)</p> <p>फिल्ड/फार्म तकनीशियन</p> <p>श्री रामानन्द वैद्य (टी-4)</p> <p>श्री मुन्ना लाल रविदास (टी-II-3)</p> <p>श्री रामदेव पाठक (टी-I-3)</p> <p>श्री रामलोचन राम (टी-I-3)</p> <p>श्री हरिहर नाथ शुक्ल (टी-I-3)</p> <p>श्री कामता प्रसाद गुप्ता (टी-I-3)</p> <p>श्री कस्तुरचन्द जैन (टी-2)</p> <p>श्री दिलीप कुमार सिंह (टी-2)</p> <p>श्री अनिल कुमार सिन्हा (टी-2)</p> <p>श्री डेविड विलियम रूण्डा (टी-I)</p> <p>श्री परवेज आलम अंसारी (टी-I)</p> <p>श्री राम गुलाम सिंह (टी-I)</p>	<p>प्रयोगशाला तकनीशियन</p> <p>श्री भोला राम (टी-II-3)</p> <p>श्री गणपति महादेव बोरकर (टी-I-2)</p> <p>श्री शिशिर कुमार चटजी (टी-I-3)</p> <p>श्री घनश्याम दास (टी-I-3)</p> <p>श्री राम किशोर स्वांसी (टी-I-3)</p> <p>क्षेत्रीय लाख अनुसंधान केन्द्र, धर्मजयगढ़</p> <p>फिल्ड/फार्म तकनीशियन</p> <p>श्री रंजीत सिंह मालिया (टी-II-3)</p> <p>श्री जीवन लाल (टी-I-3)</p> <p>प्रयोगशाला तकनीशियन</p> <p>श्री अजमेर हुसैन (टी-I-3)</p>
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पादप विज्ञान अनुभाग

अनुभागाध्यक्ष

डॉ. प्रणय कुमार

वरिष्ठ वैज्ञानिक

डॉ. भरत प्रसाद सिंह (शस्य विज्ञान)

वैज्ञानिक

श्री सतीश चन्द्र श्रीवास्तव (पौध प्रजनन)

प्रयोगशाला तकनीशियन

श्री ध्रुवदेव प्रसाद (टी-1-3)

श्री मोहन सिंह (टी-2)

फिल्ड/फार्म तकनीशियन

श्री करमा अब्राहम नागरूवार (टी - 2)

रसायन विज्ञान विभाग

विभागाध्यक्ष

डॉ. सतीश चन्द्र अग्रवाल

वरिष्ठ वैज्ञानिक

डॉ. दीपेन्द्र नाथ गोस्वामी (भौतिकी)

डॉ. बलराम चन्द्र श्रीवास्तव (कार्बनिक रसायन)

डॉ. निरंजन प्रसाद (कार्बनिक रसायन)

डॉ. रवीन्द्र नाथ माजी (कार्बनिक रसायन)

वैज्ञानिक वरीय वेतनमान

डॉ. कृष्ण मोहन प्रसाद (कार्बनिक रसायन)

वैज्ञानिक

श्री आशीष कुमार दासगुप्ता (कार्बनिक रसायन)

श्री पीताम्बर मोहन पाटिल (भौतिक रसायन)

श्री इरूदय राजेन्द्रण (कार्बनिक रसायन)

श्री पूर्णचन्द्र सरकार (कार्बनिक रसायन)

तकनीकी अधिकारी

श्री देवधारी सिंह (टी-5)

प्रयोगशाला तकनीशियन

श्री नव कुमार डे (टी-4)

श्री तरुण कुमार साहा (टी-4)

श्री मोरिश एक्का (टी-4)

श्री उमेश्वर सहाय (टी-1-3)

श्री बसन्त प्रसाद केशरी (टी-1-3)

श्री पुलिन बिहारी सेन (टी-1-3)

श्रीमती प्रभा देवी (टी-2)

श्री हिरण्यमय दास (टी-1)

ग्लास ब्लोअर

श्री भानुराम सुखराम चौधरी (टी-1)

कनीय आशुलिपिक

श्री बसन्त कुमार रजक

प्रौद्योगिकी अनुभाग

अनुभागाध्यक्ष

डॉ. प्रेम चन्द गुप्ता

वरिष्ठ वैज्ञानिक

डॉ. अगस्त पाण्डेय (भौतिक रसायन)

वैज्ञानिक

श्री रजत कुमार बनर्जी (कार्बनिक रसायन)

श्री राधा सिंह (भौतिक रसायन)

तकनीकी अधिकारी

श्री मिनहाजुल इस्लाम (टी-5)

प्रयोगशाला तकनीशियन

श्री कवल किशोर प्रसाद (टी-4)

श्री नोवास मिंज (टी-1-3)

श्री मिथिलेश कुमार सिंह (टी-1-3)

श्री तुलसी राम (टी-1-3)

वरिष्ठ मेकेनिक

श्री सन्तोष कुमार श्रीवास्तव (टी-4)

प्रसार विभाग

विभागाध्यक्ष एवं प्रभारी संकाय अनुसंधान परियोजना

श्री रमेश चन्द्र मिश्र

प्रधान वैज्ञानिक

डॉ. शिशिर कुमार साहा (भौतिक रसायन)

वैज्ञानिक

श्री जवाहिर लाल (कृषि कीट विज्ञान)

डॉ. अनिल कुमार जायसवाल (कृषि कीट विज्ञान)

तकनीकी अधिकारी

श्री अजीज़ूर रहमान (टी-5)

श्री भक्ति प्रसाद बनर्जी (टी-5)

श्री राम चन्द्र मौर्य (टी-5)

श्री दीपक घोष (टी-5)

श्री लालचन्द्र चूड़ामणि नाथ शाहदेव (टी-5)

प्रचार अधिकारी (ऑक्जिलियरी)

श्री लाखन राम

प्रयोगशाला तकनीशियन

श्री कुमार महेन्द्र सिन्हा (टी-5)

श्री जगदीश सिंह (टी-4)

श्री विष्णु पद घोष (टी-1-3)

श्री जुगल किशोर अम्बुज (टी-1)

फिल्ड/फार्म तकनीशियन

श्री हरदुगन भेंगरा (टी-4)

श्री शिव शंकर प्रसाद (टी-1-3)

श्री शिव बचन आजाद (टी-1)

कनिष्ठ कलाकार-सह-छायाकार

श्री रमेश प्रसाद श्रीवास्तव (टी-2)

संग्रहालय सहायक

श्रीमती रत्ना सेन (टी-1)

कनीय आशुलिपिक

श्री अर्जुन कुमार सिन्हा

चालक

श्री बन्धना रुण्डा (टी-2)

प्रशासकीय एवं वित्त व लेखा अनुभाग

प्रशासकीय अधिकारी

श्री श्याम नारायण

सहायक प्रशासकीय अधिकारी

श्री हरिहर सिंह मुण्डा

वित्त एवं लेखा अधिकारी

श्री प्रदीप कुमार

अधीक्षक

श्री मो. समी उल्लाह

श्री नागेन्द्र महतो

श्री अशोक कुमार लाल

वरिष्ठ आशुलिपिक

श्री रामेश्वर रविदास

सहायक

श्री इनामुल हक

श्री अनिल कुमार चौधुरी

श्री अनवारुल हक

श्री रामवरण सिंह

श्री कुलदीप पाण्डेय

श्री कृष्णानन्द सिन्हा

श्री बुधन राम

श्री रवि शंकर

वरीय लिपिक

श्री सुदर्शन राम

श्री दुधेश्वर राम

श्री धर्मनाथ महतो

श्रीमती सती गुहा

श्री कानाई लाल चौधुरी

श्री रजनीकान्त उपाध्याय

श्री नुरजन टोपनो

श्री मो. मुबारक

श्री विजय राम

श्री इमिल गाड़ी

श्री सुभाष चन्द (प्रतनियुक्ति पर)

श्री ठिबू मिंज

कनीय आशुलिपिक

श्रीमती सुशान्ति प्रसाद

कनीय लिपिक

श्री नारायण गोप

श्री बैजनाथ गोप

श्री अनन्त पाण्डेय

श्री प्रहलाद सिंह

श्री शरत चन्द्र लाल

श्री रघुनाथ महतो

श्री बिहारी साहु

श्री विल्सन गुड़िया

श्री कामेश्वर प्रसाद आर्य

श्री प्रणय कुमार

श्री अर्जुन गोप

श्री अरुण कुमार त्रिपाठी

श्री राधा किशुन टोप्पो

श्री कृष्ण कान्याल देवनाथ

तकनीकी एवं अनुवीक्षण प्रकोष्ठ	स्टॉक मैनेज-सह-कम्पाउण्डर
वरिष्ठ तकनीकी अधिकारी	श्री चन्देश्वर पाण्डेय (टी-1-3)
श्री श्रीकृष्णमणि त्रिपाठी (टी-8)	फार्म एकक
तकनीकी अधिकारी	फार्म अधीक्षक
श्री रमेश प्रसाद (टी-5)	श्री नरेन्द्र कुमार शर्मा (टी-6)
पुस्तकालय	फिल्ड/फार्म तकनीशियन
तकनीकी अधिकारी	श्री मोहम्मद अली अंसारी (टी-II-3)
श्री राम प्रताप तिवारी (टी-5)	श्री राम चन्द्र सिंह (टी-I-3)
पुस्तकालय सहायक	श्री विजय कुमार तिवारी (टी-2)
श्री विनोद कुमार सिंह (टी-4)	टैक्टर चालक
अनुरक्षण एवं कर्मशाला एकक	श्री मरकुस सुरीन (टी-I-3)
अनुरक्षण अभियन्ता	हिन्दी प्रकोष्ठ
श्री हंस राज (टी-6)	सहायक निदेशक (रा.भा.)
वरिष्ठ मेकेनिक	श्री लक्ष्मी कान्त
श्री सपन कुमार भादुड़ी	हिन्दी अनुवादक (ऑक्जिलियरी)
यंत्र निर्माता (इन्स्ट्रूमेंट मेकेनिक)	श्री अंजेश कुमार
श्री हीरा लाल भक्त (टी-I)	परिवहन
चिकित्सा एकक	चालक
अंश-कालिक	श्री जशवन्त तिवारी
प्राधिकृत चिकित्सक	श्री नारायण लकड़ा
डॉ. नारायण प्रसाद साहु	श्री अरविन्द कुमार

31.3.1993 को श्रेणीवार कर्मचारियों की संख्या एवं उनमें अनुसूचित जाति तथा अनुसूचित जनजातियों की संख्या

पदवर्ग	स्वीकृत पदों की संख्या	कार्यरत कर्मचारियों की संख्या	अनुसूचित जाति के कर्मचारियों की संख्या	अनुसूचित जन जाति के कर्मचारियों की संख्या
वैज्ञानिक वर्ग				
आर.एम.पी. वैज्ञानिक	1	-	-	-
प्रधान वैज्ञानिक	60	31	2	-
वरिष्ठ वैज्ञानिक				
वैज्ञानिक (प्रवरण कोटि)				
वैज्ञानिक	61	31	2	-
तकनीकी वर्ग				
कटेगरी - III	4	3	-	-
कटेगरी - II	36	25	2	2
कटेगरी - I	46	40	4	6
	86	68	6	8
प्रशासकीय वर्ग				
प्रशासकीय अधिकारी	1	1	-	-
वित्त व लेखा अधिकारी	1	1	-	-
सहायक प्रशासकीय अधिकारी	1	1	-	1
सहायक निदेशक (रा. भा.)	1	1	-	-
अधीक्षक	3	3	1	-
वरीय आशुलिपिक	1	1	1	-
कनीय आशुलिपिक	4	3	1	1
सहायक	8	8	1	-
वरीय लिपिक	13	12	1	4
कनीय लिपिक	16	14	1	3
	49	45	6	9
सपोर्टिंग वर्ग				
ग्रेड - IV	11	7	2	1
ग्रेड - III	18	17	4	7
ग्रेड - II	36	33	4	15
ग्रेड - I	71	46	5	22
	136	103	15	45
आक्विजिलियरी वर्ग	14	5	1	1
कुल योग	346	252	30	63

नियुक्ति, प्रोन्नति, स्थानांतरण इत्यादि संबंधी सूचना

नियुक्ति

नाम	पदनाम	सेवारंभ की तिथि
श्री सुभाष चन्द	वरीय लिपिक (राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल से प्रतिनियुक्ति पर)	21.5.92
श्री श्याम नारायण	प्रशासकीय अधिकारी	17.6.92
श्री अंजेश कुमार	हिन्दी अनुवादक (केन्द्रीय चावल अनुसंधान संस्थान, कटक से स्थानांतरित)	1.7.92
श्री हंस राज	अनुरक्षण अभियन्ता (टी-6)	17.8.92
श्री प्रणय कुमार	कनीय लिपिक (अनुकम्पा के आधार पर)	7.12.92
श्री अरुण कुमार त्रिपाठी	कनीय लिपिक	3.3.93
श्री अर्जुन गोप	कनीय लिपिक	4.3.93
श्री राधा किशुन टोप्पो	कनीय लिपिक	4.3.93
श्री कृष्ण कन्याल देवनाथ	कनीय लिपिक	5.3.93

प्रोन्नति

नाम	पदनाम	प्रभावी तिथि
श्री फेकुआ मुंडा	बेलदार, सपोर्टिंग ग्रेड-3 से सपोर्टिंग ग्रेड-4	1.4.92
श्री लखन नायक	बेलदार, सपोर्टिंग ग्रेड - 3 से सपोर्टिंग ग्रेड - 4	1.4.92
श्री राम गुलाम सिंह	प्रयोगशाला सहचर स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री हरि राम	प्रयोगशाला सहचर स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री ननकु उरांव	बेलदार स.ग्रे. 2 से स.ग्रे.3	1.4.92
श्री महादेव उरांव	स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री रामवृक्ष राम	सफाईवाला स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री चेतु कच्छप	पुस्तकालय फरास स.ग्रे.1 से स.ग्रे.2	1.4.92
श्री राजकुमार राय	प्रयोगशाला सहचर स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री गणेश राम	सफाईवाला स.ग्रे.2 से स.ग्रे.3	1.4.92
श्री मुन्ना लाल रविदास	टी-I-3 से टी-II-3	8.6.92
श्री भोला राम	टी-I-3 से टी-II-3	8.6.92
श्री डोमनिक रूंडा	टी-I-3 से टी-II-3	3.6.92
श्री मो. अली अंसारी	टी-I-3 से टी-II-3	8.6.92
श्री राम गुलाम सिंह	स.ग्रे.2 से टी-I	8.6.92
श्री हिरण्यमय दास	स.ग्रे.3 से टी-I	8.6.92
श्री ठिबू मिंज	कनीय लिपिक से वरीय लिपिक	18.2.93

सेवा निवृत्ति

नाम	पदनाम	प्रभावी तिथि
श्री वैद्यनाथ साह	वैज्ञानिक	31.1.93
श्री डोमनिक रूण्डा	टी-II-3	31.8.92