

# ***DARJEELING TEA RESEARCH AND DEVELOPMENT CENTRE***



**Department of Commerce  
Ministry of Commerce & Industry  
Govt. of India**

**Kurseong, Darjeeling  
West Bengal India**

**H.O. 14 B.T.M. Sarani, Kolkata - 700 001**

**Darjeeling Tea Research and Development Centre** was established in 1977 at Kurseong with an experimental farm of 21.6 hectares.



*Smt. S Rai, working with Spectrophotometer.*

The Centre which is a recognized R & D Institute of the DST, Govt. of India, besides catering to the advisory requirement of Darjeeling tea gardens has developed technical know-how on various aspects of tea cultivation. The four main Divisions of research are Farm Management (Botany & Agronomy), Soil Science, Bio-chemistry and Plant Protection. The Centre has inter alia a Library, Miniature Manufacturing Unit, a green house and an Agro-meteorological Observatory.



Green House

### Important Findings :

- λ The performance of eight popular clones out of thirty Darjeeling clones has been evaluated among which B15 has been found to be superior than others.
- λ Minimum tillage replanting methodology developed for inorganic cultivation of tea.
- λ Experiment with binodal cuttings have shown their superiority in terms of better growth over single nodal cuttings.
- λ Standardised the frequency of plucking in respect of yield and quality.



Sri R. Kumar working with Portable Photosynthesis system.

- λ A soil-fertility status viz., NPK map of Darjeeling tea growing soils published.
- λ A soil Zinc status map of Darjeeling Tea Estates published.
- λ The positive effect of foliar spray of Zinc on yield has been established.
- λ Efficacy of pure salt of Zinc, Magnesium and Boron established in the increase of yield as compared to the commercial products.
- λ Effect of six different sources of sulphur fertilizer has been examined and their efficacy in rectifying the deficiency of this mineral has also been established.



Sri J. S. Bisen working with At. Abs. Spectrophotometer

- λ X-ray diffraction studies of the soils of quality and non-quality sections of Darjeeling tea gardens have been made. The genesis of the soils of this area has also been outlined on the basis of detailed morphological, physico-chemical and mineralogical analysis.
- λ Bioefficacy of different neem products in controlling certain pests of tea has been tested.
- λ Darjeeling black tea evaluated as per ISO/PFA specification.
- λ Blending compatibility of various clones released for Darjeeling hills established.
- λ  $\beta$ -D-glucosidase, a flavour releasing enzyme extracted and characterized .



Sri N. Kumar working with U.V. Vis Spectrophotometer

#### Services offered :

1. Soil, Plant, Manures/Fertilisers, water and biochemical parameters tested and recommendations offered.
2. Visiting gardens on specific problem and request.

**Thrust Areas of Research :**

1. Correlating the organoleptic evaluation with Biochemical/VFC analysis.
2. Impact of various organic and inorganic inputs on the yield and quality of Darjeeling Tea.
3. Experiments on low temperature drying.
4. Experiments to reduce winter dormancy.
5. Evolving good quality low cost concentrated organic manures.
6. Low cost package for organic cultivation.
7. Finding suitable local botanical herbs with high pesticidal and nutritive properties.
8. Pesticide Residue and heavy metal analysis.



Miniature manufacturing of trial samples in progress.

**Collaborative Research :**

1. Collaboration with Karlu Ruhe Institute of Technology, Germany, C-DAC, Kolkata and Jadavpur University, Kolkata for development of electric nose.
2. Collaboration with IIT, Kharagpur on physico-chemical properties of soil, environment and production of teas.
3. Collaboration with Uttar Banga Krishi Viswavidyalaya on soil microbiological aspects of organic and inorganic cultivation of tea.
4. The Centre is also recognized by Kalyani University and North Bengal University for carrying out doctoral research.

**Centre of Excellence :**

A multi-crore rupees plan has been sanctioned for upgrading the present infrastructure of this Centre into a unique 'Centre of Excellence' which would be the first of its kind for Tea Research in the Country.



A view of an experimental plot.

### List of Publications

1. Ghosh Hajra N., Kabir S. E. and Bisen, J. S., Botanical pest control – An alternative to minimize Residue toxicity in Darjeeling Tea, Published in proceedings of conference on “Plant Protection & Human Health” held at Darjeeling on March 2, 1994. Organised by Darjeeling Planters Association.
2. Bisen, J. S. and Ghosh Hajra, N., Bioefficacy of neem products in controlling certain pests of Tea (*Camellia sinensis*). *Pestology* Vol XIX, No. 11:28-32 (1995).
3. Saha, R., Mondal, D. Bisen, J. S., Tea Soils of Darjeeling. Tea Board, India, Scientific Monograph Series No. 1, (1995).
4. Saha, R. and Bisen, J. S., Phosphate and Potash fertilizers in the optimization of yield and quality of Darjeeling black Teas. Technical Bulletin No. 7/1995, Tea Board, Darjeeling Tea Research Centre, Kurseong, Darjeeling, W.B., India – 734 203.
5. Saha, R. and Bisen, J.S., Sulphur in Darjeeling soils – its deficiencies and remedies. Technical Bulletin No. 8/1996. Tea Board, Darjeeling Tea Research Centre, Kurseong – 734203, Darjeeling, India.
6. Saha, R., Mondal, D. and Bisen, J.S., Potassium ion potential and the quantity-intensity relationship as affected by organic matter and exchangeable Aluminium ions in acidic Tea soils of Darjeeling, W.B., *J. of Hill Res.* 9(2):219-232(1996).
7. Bisen, J.S. and Ghosh Hajra, N., Testing of SELFIN (*Bacillus thuringiensis* Kurustaki serotype 3a, 3b) against Flush worm (*Cydia leucostoma*) in young tea of Darjeeling. *Pestology* Vol. XXI, No. 3, March, 1997.
8. Bisen, J. S. and Kumar R., Studies on the antifeedant properties of some plant extracts against bunch caterpillar (*Andraca bipunctata*) on tea (*Camellia sinensis* L.). *Pestology* Vol. XXI, No. 10, October, 1997.
9. Bisen, J. S. and Ghosh Hajra, N., Persistence and degradation of some insecticides in Darjeeling Tea. *Journal of Plantation Crops* 28(2):123-131, August, 2000.
10. Bisen, J. S. and Ghosh Hajra, N., Bioefficacy of some neem formulations and garlic extract against sucking pests of tea. *Pestology* Vol. XXV No. 8, August, 2001.

11. Bisen, J. S. and Ghosh Hajra, N., Efficacy of some organic fungicides against Blister Blight disease of tea in Darjeeling hills. Pestology Vol. XXVI No.8, August, 2002.
12. Bisen, J. S., Saha, R. and Bera, B., Use of neem products and garlic extract in controlling certain pests of tea (*Camellia sinensis* L.) with special reference to organic tea in Darjeeling. Accepted in world Neem Conference will be held at Coimbatore from 21st to 24th November, 2007.
13. Saha R., Soil Fertility Status Map of Tea Growing Areas of Darjeeling Hills. Pub. By Tea Board of India, 2005.
14. Saha R., Soil Zinc Status Map of Tea Estates of Darjeeling Hills. Pub by Tea Board of India, 2005
15. Technical Bulletin No. 1 : Evaluation of Herbicides for weed control in Darjeeling tea. Published by Tea Board of India, 1989, PP1-6
16. Technical Bulletin No. 2 : Effect of foliar applications of Zinc in tea under the agroclimatic condition of Darjeeling . Published by Tea Board of India 1989, PP 1-3.
17. Technical Bulletin No. 3 : Darjeeling tea in perspective of ISO specifications. Published by Tea Board of India. 1989, PP 1-6.
18. Technical Bulletin No. 4 : Performance of minimum tillage replantation under Darjeeling conditions. Published by Tea Board of India 1989. PP 1-6.
19. Technical Bulletin No. 5 : Performance of certain clones under agro-ecological conditions of Darjeeling. Published by Tea Board, India 1991. PP 1-6
20. Technical Bulletin No. 6 : Training of young tea in Darjeeling, Published by Tea Board of India 1991, PP 1-5
21. Kabir S. E., Ghosh Hajra N. and Kumar R., 1996. Effect of plucking intervals on yield and quality of Darjeeling Tea; J Plantation crops 24 (Suppl) : 758-762.
22. Ghosh Hajra N. and Kumar R., 1999. Seasonal variation in photosynthesis and productivity of young tea; Expl Agric 35 : 71-85
23. Ghosh Hajra, N. and Kumar R 2002. Diurnal and seasonal variations in gas exchange property of tea leaves; J Plant Biol 29 : 169-173
24. Ghosh Hajra N. and Kumar R. 2002 Responses of young tea clones to subtropical climate : Effects on photosynthetic and Biochemical characteristics; J Plant Biol 29 : 257-264.
25. Ghosh Hajra N and Kumar R 2003. Gas exchange characteristics of tea (*Camellia sinensis*) in sub tropics; Indian J Plant Physiol. (Special Issue) : 749-754.
26. Ghosh Hajra N. and Kumar R, 2004 Influence of environmental variables on gas exchange and productivity of tea; Proceedings of the international conference on O-CHA (tea) Culture and Science NOV, 4-6, Shizuoka, Japan, PP 181-184

27. Kumar, N., Chaudhury, T.C and Ghosh Hajra, N. 1992. Seasonal and grade variations in ISO Specifications for black tea – A Darjeeling perspective. *Journal of Plantation Crops* 20 : 323-330.
28. Kumar, N., Rai, R., Ghosh Hajra, N. and Chaudhury, T. C. 1993. Dry matter content of certain tea clones under agroclimatic conditions of Darjeeling. *Journal of Plantation Crops* 21 : 32-37.
29. Kumar, N., Rai, R., Ghosh Hajra, N. and Chaudhury, T. C. 1993. Improvement in quality of Darjeeling teas through blending during manufacture. *Journal of Plantation Crops* 21 : 385-389.
30. Kumar, N., Rai, R., Ghosh Hajra, N. and Chaudhury, T. C. 1996. Effect of dry matter content on quality of Darjeeling teas. *Journal of Plantation Crops* 24 : 763-767.
31. Kumar, N., Rai, R. and Ghosh Hajra, N. 2002. Plucking cycle in relation to quality of Darjeeling teas. *Plantation Research and Development in the Millennium* : 436 – 441.
32. Kumar, N., Rai, R. and Ghosh Hajra, N. 2002. Extraction, isolation and characterization of  $\beta$ -D-glucosidase in Darjeeling teas. *Proceedings of the 15th Plantation Crops Symposium Placrosym XV* : 701-704.