

## Brief Biodata of Dr Bikash Das

Dr. Bikash Das has more than 22 years of research experience in the field of Horticulture-based production systems under the hill and plateau regions of eastern India. He completed his Ph.D. in Horticulture (Pomology) from the Indian Agricultural Research Institute, New Delhi, in 2000 and started his professional career as a scientist at the ICAR Research Complex for Eastern Region, Ranchi, in 2000.

### Areas of research experience

Genetic resource management, Fruit based multitier system in rainfed uplands, high density orcharding, Canopy management, rainwater harvesting, rice fallow management, climate resilient agriculture, farming system research

### Major scientific contributions:

1. Plant genetic resource management:
  - a. Collection, conservation, evaluation and characterization of mango, litchi, guava, jackfruit, jamun, bael, peach germplasm
  - b. Preparation of guidelines for DUS testing of litchi
2. Release of varieties:
  - a. Fruits: Swarna Manohar and Swarna Poorti in Jackfruit, Swarna Madhu in litchi, Swarna Vasudha in bael
  - b. Vegetables: Snow pea variety Swarna Tripti, Vegetable soybean variety Swarna Vasundhara, Lima bean variety Swarna Poshan, faba bean variety Swarna Safal, Red amaranth variety Swarna Raktim
3. Recommendation of superior varieties of mango, litchi, guava, sapota, peach, pear, bael, strawberry for cultivation in eastern plateau and hill region
4. Production technologies standardized:
  - a. Mango based multitier cropping system for rainfed uplands
  - b. Ultra high density orcharding in guava and mango for rainfed uplands
  - c. Nutrient management in litchi
  - d. Determination of maturity index in litchi based on Heat unit accumulation
  - e. Girdling in litchi
  - f. Fruit bagging in litchi
  - g. Grafting in litchi
  - h. Extending harvesting period in litchi
  - i. Rejuvenation of old and senile mango orchards
  - j. Crop regulation in guava
  - k. Basin enrichment of fruit orchard through recycling of biomass of *Tephrosia candida*
  - l. Appropriate pit size of planting of new mango saplings under acid soils conditions
  - m. Management of litchi stink bug (*Tessaratoma javanica*)
  - n. Diversifying of rice-fallow cropping systems in the Eastern Plateau region
  - o. Development of integrated farming system model for rainfed uplands
5. Novel concepts developed:
  - a. Understanding of flushing and panicle emergence in litchi
  - b. Assimilate partitioning in litchi
  - c. Models for dry biomass and carbon stock estimation in *Litchi chinensis*
  - d. Identification of insect entomopathogenic fungus of insect pests *Hirsutella* sp. infecting mango hopper
  - e. Development of prediction models developed for mango pests

- f. Estimation of biomass production and carbon stocks estimate in mango orchards
- g. Developmental stage-associated microbiota profile of the peach fruit fly, *Bactrocera zonata*
- h. Taxonomic and functional diversity of bacterial communities associated with melon fly, *Zeugodacus cucurbitae* (Diptera: Tephritidae)

#### Top 30 research papers published:

1. Das, B., Jana, B.R., Dey P. and Nath, V. 2011. Assimilate partitioning behaviour in relation to fruit growth in 'Shahi' litchi. *International Journal of Fruit Science*, 11:88–98
2. Das, B., Sarkar, P.K., Kumari, N., Dey, P., Singh, A.K. and Bhatt, B.P., 2019. Biophysical performance of different multipurpose trees species in Jharkhand, India. *Current Science*, 110 (1): pp. 82-88
3. Das, B., Sarkar, P.K., Dhakar, M.K., Naik, S.K., Maurya, S., Singh, A.K., Kumar, S. and Bhatt, B.P., 2021. Basin enrichment of bael plants through alley cropping of biomass producing plants: Effects on plant growth and soil properties. *Fruits*, 76 (2):61-71
4. Das, B., Dhakar, M.K., Sarkar, P.K., Kumar, S., Nath, V., Dey, P., Singh, A.K. and Bhatt, B.P., 2017, April. Performance of mango (*Mangifera indica*) based agri-horticultural systems under rainfed plateau conditions of eastern India. *Indian Journal of Agricultural Sciences* **87** (4): pp. 521–527,
5. Das, B., Nath, V., Jana, B.R., Kumar, S. and Dey, P., 2007. Evaluation of different methods of crop regulation in guava grown under rainfed plateau conditions of eastern India. *Indian J. Hort.* 64(3): pp. 294-299
6. Das, B., Mehta, S., Singh, S.K., Mali, S., Dhakar, M.K. and Singh, A.K., 2018. Pruning effects on Sardar guava planted in ultra high density orcharding under different rainfall scenarios. *Indian Journal of Horticulture*, 75(4), pp.583-590.
7. Das, B., Nath, V. and Dey, P., 2004. Investigations on flushing and panicle emergence in litchi under sub-humid sub-tropical plateau region of eastern India. *Indian Journal of Horticulture*, 64(2), pp.136-143
8. Das, B., Nath, V., Jana, B.R., Dey, P., Pramanick, K.K. and Kishore, D.K., 2007. Performance of strawberry cultivars grown on different mulching materials under sub-humid subtropical plateau conditions of eastern India. *Indian Journal of Horticulture*, 61(1), pp.1-5
9. Das, B. and Dhakar, M.K., 2016. Effect of interstock on growth of vigorous mango cultivars under eastern plateau and hill region of India. *Vegetos*, 29 (2): 1-5
10. Das, B., 2016. Root distribution pattern in two age groups of litchi plants growing under Alfisols of Eastern plateau and hill region of India. *Ecology Environment and Conservation*, 22, pp.75-81.
11. Choudhary, J.S., Mali, S.S., Naaz, N., Malik, S., Das, B., Singh, A.K., Rao, M.S. and Bhatt, B.P., 2021. Spatio and temporal variations in population abundance and distribution of peach fruit fly, *Bactrocera zonata* (Saunders) during future climate change scenarios based on temperature driven phenology model. *Climate Risk Management*, 32: 1-15.
12. Choudhary, J.S., Mali, S.S., Mukherjee, D., Kumari, A., Moanaro, L., Rao, M.S., Das, B., Singh, A.K. and Bhatt, B.P., 2019. Spatio-temporal temperature variations in MarkSim multimodel data and their impact on voltinism of fruit fly, *Bactrocera* species on mango. *Scientific reports*, 9(1), pp.1-12.
13. Sarkar, B., Das, B., Sundaram, P.K., Mali, S.S., Anurag, A.P., Upadhyaya, A., Chandra, N., Bhatt, B.P. and Kumar, A., 2022. Energy input–output analysis and greenhouse gas emission in okra and tomato production in Chotanagpur plateau

- region of India. *Environment, Development and Sustainability*, 2022. <https://doi.org/10.1007/s10668-022-02596-w>
14. Dhakar, M.K., Das, B., Sarkar, P.K., Nath, V., Singh, A.K. and Bhatt, B.P., 2020. Diversity in jackfruit (*Artocarpus heterophyllus* Lam.): insights into fruit characterization for the identification of superior genotypes. *Plant Genetic Resources*, 18(5): 307-315.
  15. Choudhary, J.S., Naaz, N., Prabhakar, C.S., Rao, M.S. and Das, B., 2015. The mitochondrial genome of the peach fruit fly, *Bactrocera zonata* (Saunders)(Diptera: Tephritidae): Complete DNA sequence, genome organization, and phylogenetic analysis with other tephritids using next generation DNA sequencing. *Gene*, 569(2): 191-202.
  16. Singh, A.K., Das, B., Mali, S.S., Bhavana, P., Shinde, R. and Bhatt, B.P., 2020. Intensification of rice-fallow cropping systems in the Eastern Plateau region of India: diversifying cropping systems and climate risk mitigation. *Climate and Development*, 12(9), pp.791-800.
  17. Kumar, P.R., Maurya, S., Chakrabarty, A., Yadav, V.K., Naskar, S., Gupta, S., Kumari, S., Singh, A.K., Bhatt, B.P. and Das, B., 2020, March. Farm diversification options for ensuring livelihood security of peri-urban farmers in eastern plateau and hill region: Learnings from Farmer FIRST Project. ICAR. *Indian Journal of Agricultural Sciences* 90 (3): pp. 643–649
  18. Pan, R.S., Shinde, R., Sarkar, P.K., Seth, T., Srivastava, A., Das, B., Lemtur, M., Singh, A.K. and Bhatt, B.P., 2022. Breeding potential of acrid elephant foot yam genotypes for yield and nutritional quality using multivariate analysis. *South African Journal of Botany*, 146: 653-661.
  19. Naik, S.K., Sarkar, P.K., Das, B., Singh, A.K. and Bhatt, B.P., 2018. Predictive models for dry biomass and carbon stock estimation in Litchi chinensis under hot and dry sub-humid climate. *Archives of Agronomy and Soil Science*, 64(10): 1366-1378.
  20. Naaz, N., Choudhary, J.S., Choudhary, A., Dutta, A. and Das, B., 2020. Developmental stage-associated microbiota profile of the peach fruit fly, *Bactrocera zonata* (Diptera: Tephritidae) and their functional prediction using 16S rRNA gene metabarcoding sequencing. *3 Biotech*, 10(9): 1-13.
  21. Choudhary, J.S., Naaz, N., Prabhakar, C.S., Das, B., Singh, A.K. and Bhatt, B.P., 2021. High taxonomic and functional diversity of bacterial communities associated with melon fly, *Zeugodacus cucurbitae* (Diptera: Tephritidae). *Current Microbiology*, 78(2): 611-623.
  22. Naik, S.K., Sarkar, P.K., Das, B., Singh, A.K. and Bhatt, B.P., 2019. Biomass production and carbon stocks estimate in mango orchards of hot and sub-humid climate in eastern region, India. *Carbon Management*, 10(5): 477-487.
  23. Naik, S.K., Das, B., Kumar, S. and Bhatt, B.P., 2015. Evaluation of major and micronutrient status of acid soils of different mango orchards. *International Journal of fruit science*, 15(1): 10-25.
  24. Pramanick, K.K., Kishore, D.K., Sharma, S.K., Das, B.K. and Murthy, B.N.S., 2013. Strawberry cultivation under diverse agro-climatic conditions of India. *International Journal of Fruit Science*, 13(1-2), pp.36-51.
  25. Kumari, N., Srivastava, P., Mehta, S. and Das, B., 2016. Allelopathic effects of some promising agro forestry tree species on different annual crops. *Ecology, Environment and Conservation*, 22 (1): 225-236
  26. Choudhary, J.S., Prabhakar, C.S., Das, B. and Kumar, S., 2013. Litchi stink bug (*Tessaratomia javanica*) outbreak in Jharkhand, India, on litchi. *Phytoparasitica*, 41(1): 73-77.

27. Choudhary, J.S., Mali, S.S., Naaz, N., Mukherjee, D., Moanaro, L., Das, B., Singh, A.K., Rao, M.S. and Bhatt, B.P., 2020. Predicting the population growth potential of *Bactrocera zonata* (Saunders)(Diptera: Tephritidae) using temperature development growth models and their validation in fluctuating temperature condition. *Phytoparasitica*, 48(1): 1-13.
28. Choudhary, J.S., Prabhakar, C.S., Maurya, S., Kumar, R., Das, B. and Kumar, S., 2012. New report of *Hirsutella* sp. infecting mango hopper *Idioscopus clypealis* from Chotanagpur Plateau, India. *Phytoparasitica*, 40(3): 243-245.
29. Dhakar, M.K., Das, B., Nath, V., Sarkar, P.K. and Singh, A.K., 2019. Genotypic diversity for fruit characteristics in bael [*Aegle marmelos* (L.) Corr.] based on principal component analysis. *Genetic Resources and Crop Evolution*, 66(4): 951-964.
30. Choudhary, J.S., Naaz, N., Lemtur, M., Das, B., Singh, A.K., Bhatt, B.P. and Prabhakar, C.S., 2018. Genetic analysis of *Bactrocera zonata* (Diptera: Tephritidae) populations from India based on *cox1* and *nad1* gene sequences. *Mitochondrial DNA Part A*, 29(5): 727-736.

**Total number of citations: 1026**

***h*-index: 17**

***i*-10 index: 42**

❖ **9 externally funded projects - > Rs. 7.0 crores and 7 institutional projects successfully completed**

#### **Recognitions**

1. Recipient of ICAR Fakhruddin Ali Ahmed Award for outstanding research in tribal farming system 2013
2. Fellow of national Academy of Horticultural Sciences, New Delhi