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Areas of research : Agricultural Biotechnology

Education

Ph. D.- 1987 in Soil Microbiology with thesis on "Biochemical interactions between *Azospirillum brasilense* and roots of pearl millet", University of Jodhpur, India

M.Sc.,- 1976 in Microbiology, Osmania university, Hyderabad, India.

B.Sc., - 1974 Biology, Chemistry and Physics, Government college, Khammam, AP, India.

Experience profile

Dr. B.Venkateswarlu has a total of 30 years of research experience in the field of agricultural microbiology. He worked in various capacities at ICRISAT, CAZRI and CRIDA since 1976. His main research contributions have been in the fields of biofertilisers, PGPR and soil organic matter dynamics. He has handled 10 research projects so far at national level, which include one funded by USDA, one funded by ACIAR (Australia) and one by AP Netherlands biotechnology programme. Currently he is Director of the Central Research Institute for Dryland Agriculture which is one of the premier institutes of ICAR working on dryland agriculture and climate change. Earlier, he was Head of the Division of Crop Sciences and Principal Scientist in Agricultural Microbiology and implemented several research projects in the fields of biological nitrogen fixation, biofertilizers and PGPR for over 25 years. Most recently, he served as the Co-Principal Investigator of the ICAR Network Project on Application of Micro-organisms in Agriculture and Allied Sectors (AMAAS) for the Sub-Project on Abiotic Stress Management.

Dr. Venkateswarlu has published more than 85 research papers in national and international journals, presented 50 papers in seminars, symposia and workshops in India and abroad, written three books. He also extensively contributed to the local press, electronic media and many national and international magazines/news letters on issues related to bio inputs in agriculture, its application and public safety etc., Visited a number of countries like USA, Canada, Australia, Malaysia, UK, Thailand and China under scientist exchange programmes and as a member of scientist delegation etc.

Special recognitions and important professional assignments

1. Best paper prize at the 7th International Biotechnology Conference, New Delhi, November 1984, to a paper on formulation of complete liquid medium for *Azospirillum*.
2. Invited to advise M/s. Godavari Fertilizers and Chemicals, Hyderabad, AP in setting up of the biotechnology unit in 1993.
3. Worked as a Member of the scientific team to identify research priorities in biotechnology under the AP-Netherlands Project of Institute of Public Enterprises, Hyderabad during May, 1994.
4. Best research paper award on neem micropropagation technology and its commercialisation at International Tree Conference on Micro propagation (IUFRO), April 1998, New Delhi.
5. Worked as an Expert Member of the Scientific Team to develop a rainfed farming research project for eastern India sponsored by HRDA/DFID, UK in October 4-8, 1999.
6. Member of the Indian Federation of Organic Farming Movements (IFOAM).
7. Worked as Member, Board of Studies in Microbiology of the Dept. of Microbiology, Osmania University, Hyderabad and Gulbarga University, Karnataka, for one term.
8. Honorary Member, Board of Directors, Hyderabad biolife, a leading manufacturer of biopesticides and biofertilisers in Hyderabad, A.P.
9. Technical adviser and consultant to a number of private and nongovernmental organisation in the area of biotechnology application in agriculture.
10. Worked as in charge of IPR cell at the institute and attended/organised a number of awareness training programmes to scientists on WTO, IPRs with special reference to Agricultural biotechnology.
11. Gave special lectures on IPRs and biotechnology at several formal and informal meetings, seminars, training programmes at research institutes and colleges in India.
12. Member of the technical programme committee for the World Neem Conference, Mumbai, November 2002.

Membership of Professional Societies

1. Member of the New York Academy of Sciences
2. Life Member of Association of Microbiologists of India.
3. Member (Associate) of All India Biotech Association, New Delhi.
4. Member of Neem Foundation, Mumbai.
5. Life Member of Indian Society of Oilseeds Research, Hyderabad.
6. Member of Indian Society of Dryland Agricultural Research, Hyderabad.

Research Supervision

He has guided 4 students for Ph.D. in Microbiology and acted as External Examiner for the Ph.D thesis in several Universities in India like Kolkata University, University of Agricultural Sciences, Dharwad, Gulbarga University, Osmania University, Nagarjuna University, etc.

He is recognised Guide for Ph.D degree in the field of Microbiology in Osmania University and Jawaharlal Nehru Technological University, Hyderabad. Currently, 5 students are pursuing Ph.D degree in Soil Microbiology in different specialisations with these two universities.

Publications

i)	Research papers	84 (44 International, 40 national)
ii)	Papers presented at Seminars/ symposia/conferences	73
iii)	Books and chapters in books	17
iv)	Popular articles	22

List of Selected Publications

1. Desai, S., Narayanaiah, Ch., Kranti Kumari, Ch., Reddy, M.S., Gnanamanickam, S.S., Rajeswar Rao, G. and Venkateswarlu, B. (2007). Seed inoculation with *Bacillus* spp. Improves seedling vigour in oil-seed plant *Jatropha curcas* L. **Biol Fertil Soils**. 44:229-234.
2. Venkateswarlu, B., Srinivasa Rao, Ch, Ramesh, G., Venkateswarlu, S. and. Katyal, J.C. (2007) Effects of long term – legume cover crop incorporation on soil organic carbon, microbial biomass, nutrient build up and grain yields of sorghum / sunflower under rainfed conditions. **Soil Use and Management**, vol. 23, 100-107.
3. Venkateswarlu, B., Medeleine Pirat, Kishore, N, and Abdul Rasul (2007). Mycorrhizal inoculation in neem (*Azadirachta indica*) enhances azadirachtin content in seed kernels. **World Journal of Microbiology and Biotechnology**, Vol 24(7) 1243-1247.
4. Srinivasarao, Ch., Basu, P.S., Venkateswarlu, B. and Masood Ali (2006). Variations in nodulation and nitrogen uptake in twenty chickpea genotypes under rainfed conditions. **Indian J. Dryland Agricultural Research and Development**, 21(1) : 50-52.
5. Srinivasarao, Ch., Ganeshamurthy, A.N., Ali, M. and Venkateswarlu, B., (2006). Phosphorus and micronutrient nutrition of chickpea genotypes in a multi nutrient deficient typic ustochrept. **Journal of Plant Nutrition**, 29: 1-17.
6. Venkateswarlu, B. and Srinivasa Rao, Ch. (2004). Soil microbial diversity and the impact of agricultural practices. **Ind. J. of Dryland Agricultural Res. & Dev.** Vol.19(2), pp.97-105.

7. Venkateswarlu, B. (2004). Response of greengram and pigeonpea to *Bradyrhizobium*-inoculation and soil moisture conservation practice. **Ind. J. of Microbiology**. Vol.44 (3), pp.215-217.
8. Singh, A. Negi, M. S., Moses, V. K., Venkateswarlu, B, Srivastava, P.S. and Lakshmikumaran, M (2002). Molecular analysis of micro propagated neem plants using AFLP markers for ascertaining clonal fidelity. **In Vitro Cell. Dev. Biol. (plant)** Vol 38(5), pp 519-524(6).
9. Venkateswarlu, B. and Katyal, J.C. (2001). Lack of relationship between summer soil temperature at the source of isolation and symbiotic performance of *Bradyrhizobium* strains at elevated temperatures. **Indian J. Dryland Agric. Res. & Dev.** 16(2). 131-144.
10. **Venkateswarlu, B., Hari, K. and Katyal, J.C. (1997). Influence of soil and crop factors on the native rhizobial populations in soils under dryland farming. *Applied soil ecology*. 7 : 1-10.**
11. **Venkateswarlu, B. (1997). Water stress and biological nitrogen fixation in legumes – A review. *Indian J. Dryland Agric. Res. & Dev.* 12(1) : 51-53.**
12. Srinivasa Rao, M. and Venkateswarlu, B. (1996). Efficiency of different strains of *Bacillus thuringiensis* against some lepidopteron pests of castor (*Ricinus communis* L.). **Indian J. Dryland Agric. Res. & Dev.** 11(1) : 28-32.
13. Venkateswarlu, B. and Vanaja, M. (1996) Detection of nitrate reductase activity in gynophores and pods of groundnut. **J. Oil Seeds Res.** 13(2) : 217-220.
14. Venkateswarlu, B. (1996). Pit inoculation –An alternative method for effective nodulation in transplanted *Leucaena leucocephala*. **Indian J. Microbiol.**, 36 : 233-234.
15. Srinivasa Rao, M., Venkateswarlu, B. and Sankaram, A.V.B. (1996). Evaluation of neem and custard apple formulations against castor semilooper (*Achoea janata*). **Pestology** Vol.XX, No.8 pp.16-19.
16. Katyal, J.C., Venkateswarlu, B. and Das,S.K. (1994). Biofertilizers for nutrient supplementation in dryland agriculture - Potentials and Problems. **Fertilizer News**, 39 (4) : 27-32
17. Maruthi Sankar, G.R., Subba Reddy, G., Venkateswarlu, B. and Katyal, J.C. (1993). Screening of dose-response relationships through different green leaf materials in sorghum. **Jour. Ind.Soc. Ag. Statistics**, 45 (2) : 219-225
18. Das, S.K., Subba Reddy, G., Sharma, K.L., Vittal, K.P.R., Venkateswarlu, B. and Reddy Narayana, M. (1993). Prediction of nitrogen availability in soil after crop residue incorporation. **Fertilizer Research**, Vol.34, pp 209-215
19. Venkateswarlu, B (1993). Potential strategies for sustaining BNF in drylands. **BNF Bulletin, NifTal**, Hawaii, USA. Vol. XII, No.2 p 8.
20. Venkateswarlu, B, Mukhopadhyaya, K. and Ramesh, K. (1993). Effect of PEG induced water stress on cell cultures of groundnut in relation to the response of whole plants. **Oleagineux**, Vol. 48 No.11, pp. 463-468
21. Venkateswarlu, B. and Ramesh, K. (1993). Cell membrane stability and biochemical response of cultured cells of groundnut under PEG induced water stress. **Plant Science**. 90(2) : 179-185
22. Venkateswarlu, B (1992). Performance of biofertilizers in dryland agriculture - A critical review and future research needs. **Indian J. Dryland Agri. Res. & Dev.** Vol.7 124-132

23. Subba Reddy, G., Venkateswarlu, B., Vittal, K.P.R. and Shankar, G.R.M. (1991). Effect of substitution of fertilizer nitrogen with *Leucaena leucocephala* leaves on growth and yield of rainfed Sorghum. **Ind. J. Agril. Sci.** 61 (5), 316- 319
24. Subba Reddy, G., Venkateswarlu, B., Vittal, K.P.R. and Shankar, G.R.M.(1991). Effect of different organic materials as source of nitrogen on growth and yield of sorghum. **Ind.J. Agril.Sci.** 61 (8), 551-555
25. Venkateswarlu, B., Maheswari, M and Subba Reddy, G.(1991). Relationship between nodulation, nitrogen fixation rate, N- harvest index and kernel yield in different groundnut varieties under dryland conditions, **Oleagineux**, Vol 46 (6) 239-243
26. Subba Reddy, G., Venkateswarlu, B. and Vittal, K.P.R. (1991). Green leaf manuring as an alternative nitrogen source for castor bean on marginal soils of India. **American J. Alternative Agriculture.** Vol. 6(3), 132-138
27. Venkateswarlu, B., Maheswari, M. and Subba Reddy, G. (1990). Effect of water stress on N₂-fixation and N-partitioning in Groundnut in relation to kernel yield. **Indian Journal of Experimental Biology** 29 : 272-275
28. Venkateswarlu, B., Saharan, N. and Maheswari, M. (1990). Nodulation and N₂(C₂H₂) fixation in cowpea and groundnut during water stress and recovery. **Field Crops Res.** 21 : 223-232
29. Venkateswarlu, B., Korwar, G.R., and Singh, R.P. (1990). Studies on nitrogen fixation and nutrient addition by *Leucaena leucocephala* in a semi-arid alfisol. **Leucaena Res. Reports** 11 : 65-67
30. Venkateswarlu, B., Korwar, G.R. and Singh, R.P. (1990). Nodulation, Nitrogenase activity and growth of *Leucaena leucocephala* seedlings as influenced by container size and time of inoculation. **Leucaena Res. Reports.** 11: 62-64
31. Venkateswarlu, B., Maheswari, M. and Saharan, N. (1989). Physiological basis for the inhibition of nitrogenase activity in water stressed cowpea (*Vigna unguiculata* (L.) Walp) **Current. Science.** 58 : 864-867
32. Venkateswarlu, B., Maheswari, M. and Saharan, N. (1989). Effects of water deficit on N (C₂H₂) fixation in cowpea and groundnut. **Plant and Soil** 114: 69-74.
33. Venkateswarlu, B. and Singh, R.P. (1988). Nodulation and Nitrogenase activity patterns of *Leucaena leucocephala* and *Gliricidia sepium* during early stages of growth. **Leucaena Res.Reports** 9: 55-58.
34. Rao, A.V. and Venkateswarlu, B. (1988). Seeds of graminaceous plant as carriers of *Azospirillum*. **Current Science.** Vol.57 No.5 : 257-258.
35. Manga, V.K., Venkateswarlu, B. and Saxena,M.B.L. (1987). Combining ability and heterosis for non-symbiotic nitrogen fixation in pearl millet. **Indian J. of Agricultural Sciences.** 57(3) : 135-137.
36. Rao, A.V. and Venkateswarlu, B.(1987). Nitrogenase activity of pearl millet - *Azospirillum* association in relation to the availability of organic carbon in the root exudates. **Proc. Indian Acad. Sci. (Plant Sci.)**. Vol.97(1) : 33-37.
37. Venkateswarlu, B., and Rao, A.V. (1987). Quantitative effects of field water deficits on N (C₂H₂) fixation in selected legumes grown in the Indian desert. **Biology Fertility Soils** 5: 18-22.

38. Rao, A.V. and Venkateswarlu, B. (1987). Nitrogen fixation as influenced by water stress in selected crop legumes of the Indian arid zone. ***Arid Soil Research & Rehabilitation*** Vol.1 : 89-96
39. Rao, A.V. and Venkateswarlu, B. (1986). Influence of seed exudates of graminaceous plants on *Azospirillum brasilense*. ***Indian J. Microbiology***. Vol. 26 : 235-238.
40. Rao, A.V. and Venkateswarlu, B. (1985). Salt tolerance of *Azospirillum brasilense*. ***Acta Microbiologica*** 32 (3) : 221- 224.
41. Venkateswarlu, B. and Rao, A.V. (1985). Interactions between root exudates of pearl millet and *Azospirillum brasilense*. ***Proceedings Indian Academy of Sciences***. Vol. 95(4): 237-245.
42. Venkateswarlu, B. and Rao, A.V. (1985). Physiological studies on *Azospirillum Spp.* isolated from the roots of diverse plants. ***Zentral blatt. Fur Microbiologie***. Vol.140 : 521-526
43. Manga, V.K., Venkateswarlu, B. and Saxena, M.B.L. (1985). Gene action for nitrogenase activity in the roots of pearl millet. ***Indian Journal of Agril. Sciences*** 55(6): 391-392.
44. Rao, A.V. and Venkateswarlu, B. (1985). Most probable number of *Azospirillum* in the roots of inoculated pearl millet : ***Plant and Soil***. Vol. 88 : 153-158.
45. Rao, A.V., Venkateswarlu, B. and Henry, A. (1984). Genetic variation in nodulation and nitrogenase activity in guar and moth. ***Ind. J. Gen.*** Vol. 44(3): 425-428
46. Venkateswarlu, B. and Rao, A.V. (1984). Biofertilizers for improving arid soils. ***Indian Farming***. Vol.XXXIV (7) : 26-28.
47. Garg, B.K., Venkateswarlu, B., Vyas, S.P., and Lahiri, A.N. (1984). Nodulation and Nitrogenase activity in clusterbean and mothbean under salt stress. ***Ind. J. Exptl. biol.*** 22 : 511-512
48. Garg, B.K., Venkateswarlu, B., Rao, A.V. and Lahiri, A.N. (1984). Relative activities of nitrogenase and nitrate reductase in mungbean and clusterbean under dryland condition. ***Science and Culture*** 50 : 128-130.
49. Venkateswarlu, B. and Rao, A.V. (1983). Evaluation of phosphorus solubilisation by microorganisms isolated from arid soils. ***J. Ind. Soc. Soil Sci.*** 32 : 273-277.
50. Rao, A.V. and Venkateswarlu, B. (1983). Pattern of nodulation and nitrogen fixation in moth bean. ***Ind. J. Agril. Sci.*** 53 (12) : 1035-1038
51. Venkateswarlu, B. and Rao, A.V. (1983). Response of pearl millet to inoculation with different strains of *Azospirillum brasilense*. ***Plant and Soil*** 74 : 379-386
52. Rao, A.V. and Venkateswarlu, B. (1983). Microbial ecology of the soils of Indian desert. ***Agriculture Ecosystems Environment***. 10 : 361-369.
53. Venkateswarlu, B. and Rao, A.V. (1983). Use of reducing compounds in the cultivation of *Azospirillum*. ***Acta Microbiologica Hung.*** 30(2) : 99-102.
54. Venkateswarlu, B., Rao, A.V. and Lahiri, A.N.(1983). Effect of water stress on nodulation and nitrogenase activity of guar (*Cyamopsis tetragonoloba* (L.) Taub). ***Proc. Ind. Acad. Sci.*** 92(3) : 297-301.
55. Venkateswarlu, B., Rao, A.V. and Lahiri, A.N. (1983). Symbiotic performance of rhizobial strains on guar (clusterbean) grown in a desert soil. ***Egyptian J. Microbiol.*** 18(1-2): 9-14.

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57. Rao, A.V. and Venkateswarlu, B. (1982). Associative symbiosis of *Azospirillum lipoferum* with decotyledonous succulent plants of the Indian desert. **Canadian J. Microbiol.** 28(7) : 778-782.
58. Venkateswarlu, B., Raikhy, N.P. and Agarwal, R.K. (1982). Effect of inoculation and cobalt application on nodulation and nitrogen fixation in guar. **J. Ind. Soc. Soils Sci.** 30 (4): 550-551.
59. Rao, A.V. and Venkateswarlu, B. and Kaul, P (1982). Isolation of a phosphate dissolving soil actinomycete. **Current Science** 51 : 1117-1118.
60. Venkateswarlu, B. and Rao, A.V. (1982). Isolation of *Azospirillum* from the rhizosphere of jojoba and guayule. **Proc. Ind. Natn. Sci. Acad.** 48 B: 552-555.
61. Rao, A.V. and Venkateswarlu, B. (1982). Nitrogen fixation by *Azospirillum* isolated from tropical grasses native to Indian desert. **Ind. J. Exptl. biol.** 20 : 316-18.
62. Venkateswarlu, B. and Rao, A.V. (1982). Nitrogen fixation in some species of *Opuntia*. **Current Science.** 51 (1) : 44-45.
63. Venkateswarlu, B. and Rao, A.V. (1981). Distribution of micro-organisms in stabilized and unstabilised sand dunes of the Indian desert. **J. Arid. Environments**(U.K.) 45 : 203-207.
64. Venkateswarlu, B. Kaul, P., Agarwal, R.K. and Lahiri, A.N. (1981). Nodulation and nitrogen uptake patterns of selected grain legumes grown in a desertic soil. **Ann. Arid Zone.** 20 : 235-240.
65. Venkateswarlu, B. and R.K. Agarwal (1980). Influence of different management practices on micro organisms of a desertic soil. **Ind. J. Microbiol.** 20 : 149-151.