

**Dr. Amritha V.S.**

**Professor & PI**

**AICRP on Honey Bees & Pollinators**

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## Summary

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Obtained Ph.D. (2006) from Kerala Agricultural University, joined as Assistant Professor in Kerala Agricultural University on 15.10.2005. Research contributions area on eco-friendly management of coconut eriophyid mite revealed that starch solution was most effective, seven isolates of the mite pathogen, *Hirsutella* spp. were characterized and genetic variations were reported among the isolates of *H. thompsonii*. Timely removal of the infected combs, replacement of queen and provision of crushed garlic 0.25 per cent along with the artificial feed at weekly intervals for four times was found to be effective in managing the brood disease of Indian bee colonies. Histopathological analysis of the diseased larvae of three to four days old was carried out. Five honey-based value added products were standardized. Palynological investigations of the honey and pollen load samples of Indian bee revealed the presence of 69 different foraging plants and pollen of *Cocos nucifera* and *Mimosa pudica* were predominant. Morphometric parameters of stingless bees, *Tetragonula iridipennis* were studied and a nitidulid beetle, *Epuraea latissima* reported as the primary pest of stingless bee colonies. Safety evaluation of insecticides to bees revealed that cyantraniliprole and novaluron recorded the lowest mortality. Studies on the pollinators of *Cucumis melo* var. *acidulus* revealed that Indian bee was the dominant pollinator, the number of Indian bee hives required for yield enhancement in culinary melon was standardized as four per hectare. Principal member of Apiary Industry Sectional Committee (FAD3), BIS, Convenor of Internal Complaint Committee, Expert panel member in the Honey Mission Project of KVIC. Guided 11 M.Sc. students and 2 Ph.D. scholars. Published 19 papers.

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## Research Highlights

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- Eco-friendly management of coconut eriophyid mite, *Aceria guerreronis* using promising natural products and innovative farmer practices revealed that starch solution (5%) was most effective and suitable for being incorporated in the IPM. Regarding the oils, botanicals and synthetic acaricides, fenazaquin 0.05 per cent and sulphur W. P. 0.4 per cent gave promising results.
- Seven isolates of the mite specific fungal pathogen, *Hirsutella* spp. with distinct cultural and morphological characters from 12 locations of Thrissur district were characterized using RAPD markers. Analysis of the RAPD data using NTSYS programme revealed that there were genetic variations among the native isolates of *H. thompsonii*.
- Histopathological analysis of the diseased larvae of three to four days old revealed significant morphological variations in the lining of the mid gut epithelium where necrosis cell death and uncleared microvilli was observed.
- Five honey-based value-added products (honey jam, honey drink, honey laddoo, honey wine and honey amla) were standardised organoleptically and their nutritive value was also assessed.

- Palynological investigations of the honey and pollen load samples of Indian bee apiaries at Southern Kerala revealed the presence of 69 different foraging plants for their colonial sustenance and honey production. Of these, pollen of *Cocos nucifera* L. and *Mimosa pudica* L. were predominant as well as the frequently occurring ones.
- Significant variations in morphometric parameters of stingless bees, *Tetragonula irridipennis* which determine the pollinator efficiency was observed between midland and upland locations. The stingless bee honey quality parameters were found superior to the suggested quality standards in terms of moisture content, reducing and non-reducing sugars and diastase activity.
- The nitidulid beetle, *Epuraea latissima* K. is identified as the primary pest infesting the stingless bee colonies, its biology as well as the mode of infestation was also studied.
- Safety evaluation of new generation insecticides to bees (Indian bees and stingless bees) revealed that cyantraniliprole 20 SC @ 1.2 ml L<sup>-1</sup> and novaluron 10 EC @ 2.0 ml L<sup>-1</sup> recorded the lowest mortality in the laboratory studies. They were also found safe to the pollinators during the field evaluation in terms of their foraging behaviour when compared to that of the dimethoate 30 EC @ 0.5 ml L<sup>-1</sup>.
- Studies on the pollinators of the cross-pollinated crop, Cucumber (culinary melon - *Cucumis melo* var. *acidulus*) revealed that Indian bee, *Apis cerana indica* Fab. was the dominant pollinator, the number of Indian bee hives required for yield enhancement in culinary melon was standardized as four per hectare and a yield increase of 57 per cent was recorded through augmented pollination.
- Significant increase in per cent fruit set was observed in stingless bee pollinated cucumber (*Cucumis sativus* L.) under protected cultivation (76%) compared to hand pollinated one (54%) whereas the qualitative yield parameters like per cent malformed fruit, length and diameter of fruit were statistically on par.

## Experience

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Joined as Assistant Professor in Kerala Agricultural University on 15.10.2005. Handled classes on Agricultural Entomology (B.Sc., M.Sc. and diploma students), as PI of projects (listed below), handled training classes (on job training for VHSE student, orientation and refresher courses for beekeepers), conducted workshops, participated in project review meetings/seminars (AICRP biennial workshop, VAIGA, Vishukani, Honey Fest, etc.)

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## Education

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- B.Sc. Agriculture- Kerala Agricultural University (1999)
  - M. Sc. (Agrl. Entomology) - Kerala Agricultural University (2001)
  - Ph. D. (Agrl. Entomology) - Kerala Agricultural University (2006)
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## Area of Specialization

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Apiculture – Augmented pollination, bee management

## Awards & Recognitions

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- Bagged the award of Best AICRP Research Centre during 2013
- Bagged the award of Best AICRP centre for report during 2018
- Bagged the Woman Scientist Award-2019

## Research Projects

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### Ongoing

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- AICRP on Honey Bees and Pollinators
- Consortium project on “Exploration of gut microbiome for sustainable Beekeeping in India” funded by ICAR during 2021-22
- “Setting up of Centre of Excellence in Advanced Beekeeping” funded by NBB
- “Setting up of Mini Honey Testing Lab” funded by NBB
- Indo-Australian project on stingless bee pollination

### Completed

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1. RKVY Project on Establishment of National Level Quality Control Lab for Honey
  2. Plan project on Standardisation of honey-based value added products
  3. Plan project on Characterisation and categorisation of Indian bee honeys in Kerala based on their origin
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## Publications

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### Journal Articles

1. Joseph, J., Nalinakumari, T. and Amritha V. S. (2001). Occurrence and distribution of Cigarette beetle, *Lasioderma serricorne* Fab. on stored ginger. *Insect Environment*, 7(2): 83
2. Priya, M., Faizal, M. H., Nalinakumari, T. and Amritha, V. S. (2001). Record of two new egg parasitoids on coconut coreid bug *Paradasynus rostratus* Dist. (Hemiptera: Coreidae). *Insect Environment*, 7 (3):138
3. Amritha V. S., Saradamma, K., Bai, H. and Beevi, S. N. (2002). Natural products for the management of Coconut Eriophyid Mite, *Aceria guerreronis* Keifer. *Insect Environment*, 8(3): 104
4. Amritha, V. S. and Beevi, S. P. (2009). Occurrence of different varieties and types of *Hirsutella* spp. on coconut eriophyid mite. *Journal of Plantation Crops*, 37 (1): 34-38
5. Amritha, V. S. and Beevi, S. P. (2009). Occurrence of fungi and other microorganisms in association with the coconut eriophyid mite, *Aceria guerreronis*, in Kerala. *Journal of Biological Control*, 23 (1): 5-9
6. Amritha, V. S., Beevi, S. P. and Girija, D. (2010). Molecular characterization of *Hirsutella* isolates from the eriophyid mite, *Aceria guerreronis* infesting coconut palm, by RAPD analysis. *Entomon*, 35 (3): 1-6
7. Amritha, V. S., Premila, K. S., Rasmi, C. R., Shailaja, K. K. and Devanesan, S. 2011. Occurrence and spread of new bacterial disease in Indian honey bee *Apis cerana indica* in Kerala. *Journal of Pest Management in Horticultural ecosystems*. 17(1):165
8. Aswini, S., Amritha, V. S. and Devanesan, S. (2015). Melissopalynology studies on the Indian honey bee (*Apis cerana indica* Fab.) in southern Kerala. *Entomon* 40 (1): 1-10
9. Divya, K. K., Amritha, V. S. and Devanesan, S. (2015). Nest entrance architecture and defence mechanism in stingless bees (*Tetragonula iridipennis* (Smith): Trigonini: Meliponinae) in southern Kerala, India. *Trends in Biosciences*, 8 (17): 4751-4754

10. Divya. K. K., Amritha, V. S. and Devanesan, S. (2016). Nest architecture of stingless bees - Advances in Life Sciences, 5(6):2035-2038
11. Divya, K. K., Amritha, V. S., Viswanathan, A. and Devanesan, S. (2016). Microbial Count in Stingless Bee Honey (*Tetragonula iridipennis* (Smith)). Advances in Life Sciences, 5(6):2394 - 2397
12. Binseena, S. R., Anitha, N., Paul, A., Amritha, V. S. and Anith, K. N. (2018). Management of rice weevil, *Sitophilus oryzae* using essential volatile oils. Entomon, 43 (4): 277-280
13. Divya, K. K., Amritha, V. S., Aparna, B. and Devanesan, S. (2018). Biochemical and antioxidant properties of honey from *Tetragonula iridipennis* (Smith) of Southern Kerala. Indian Journal of Entomology, 80 (3): 1011-1016
14. Divya, K. K., Amritha, V. S. and Devanesan, S. (2018). Morphometrics of stingless bee in southern Kerala. Indian Journal of Entomology, 80 (3): 856-862
15. Reddy, B. K. K., Paul, A., Anitha, N., George, T. and Amritha, V. S. (2018). Efficacy of insecticide mixtures against sucking pests of cowpea, J. Entomol. Zool. Stud., 6: 2246-2250
16. Joseph, J. P. and Amritha, V. S. (2020). Survey and etiology of bacterial brood disease infecting Indian honey bees (*Apis cerana indica* F.) in Southern Kerala Journal of Apicultural Research, 59 (4): 519-527
17. Kaimal, D. S., Thomas, A. and Amritha, V. S. (2020). Entrepreneurial Potential of Apipreneurs in South Kerala. Journal of Extension Education, 32 (2): 6515-6519
18. Lintu, V. V., Amritha, V. S. and Paul, A. (2021). Morphological adaptations of stingless bees (*Tetragonula iridipennis*) to the floral biology of salad cucumber, *Cucumis sativus*. Insect Environment, 24 (2):249-255
19. Joy, A. and Amritha, V. S. (2021). Estimation of the duration of Indian bee (*Apis cerana indica* Fab.) venom collection. Insect Environment, 24 (2):283-286

## Popular Articles

1. Amritha V. S. 2001. Mavile meelimoota *Kerala karshakan*, (August) p. 20
2. Amritha V. S. and Archana B. 2002. Mathanga halwa *Kerala karshakan* (September) p. 31
3. Amritha V. S. and Mohan P. 2003. Mamboo pozhichil thadayam *Kerala karshakan* (January) p. 4
4. Beevi S. P. and Amritha V. S. 2007. Thengola puzhuvinu ethirkeedam *Keralakarshakan* (May)p. 36
5. Amritha V. S. and Varghese S. 2007. Vazha ilayile ila theeni ochu *Karshakasree* p. 36
6. Amritha V. S. and Hebsy Bai 2011. Varunnuu puthan thalamurakkar. *Kerala karshakan* (July) pp. 40-43
7. Amritha V.S, Premila, K.S., Resmi, K. K., Shailaja K. K. and Devanesan, S. 2012. ‘Sookshikkuka theneechakku Puthiya Rogam’. *Karshakashree*, 18 (9):80
8. Amritha V. S., Joseph, J. P. and Pahee A. 2018. Theneechayude rogate phalapradamayi niyanthrikkam *Kerala karshakan* p.23
9. Amritha V. S., Raeesa, P. and Aneetta, M. R. 2019. Karuthal, theneechakalkkayi. *Kerala Karshakan* 64 (9): 50 -52.
10. Amritha, V. S., Parvathy, M. S. and Neeraja, R. 2019. Theneecha colonykalude paripaalana murakal” 2019. *Kerala Karshakan*, 64(11): 42-43

11. Aneetta M. R. and Amritha V. S. 2019. Aadhayakaramaya vellarikrishikku ini theneechayum” Kerala Karshakan 65 (3): 48-49
12. Chincu P Babu., Akhila Pahee., and Dr. Amritha. V. S. 2019. Theneechapettikal Thayyarakkam”. Kerala Karshakan, 65 (4):64-65
13. Remya S. R., Alen Joy and Amritha V. S. 2020. Honey based value added products. Kerala Karshakan, 65 (6): 18-19
14. Lintu V. V., Amritha V. S. and Aswathy S. Asokan 2020. ‘Polyhouseile vellarikrishi aadhayakaramakkam’. Kerala karshakan, 66(9):53-54
15. Amritha, V. S., Vijayasree, V. and Nissy Issac, “ Ithaa Puthiya Poompodi keni” 2021, Karshakasree. 27(12): 98
16. Joy, A., Amritha, V. S. and Vijayasree, V. 2022. Gunamerum theneecha visham: laabhamerum theneecha Krishi. Kalpadhenu p. 31-32

### **Books/Chapters in Books**

1. Amritha, V. S. 2011. Utilization of Protozoa in Pest Management. *In. Pest management in Biocontrol of crop pests and weeds (ed. Sudharma, K.)* RKVY and Kerala Agricultural University. 214p.
2. Amritha, V. S., Anitha, N. and Paul, A. 2018. Homegarden: pests and their management. In: Thomas, A., Usha, C. T. and Reshma, J. K.(eds.), *Home gardens Structural and functional dynamics*. abc Color Systems Pvt. Ltd., Thiruvananthapuram, pp. 159-181

### **Student Guidance (Major Advisor/ Advisory Committee member)**

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**M. Sc.** : Within KAU: Completed: 11                      Outside KAU: Completed : 2  
**Ph. D** : Within KAU: Completed: 1                      Ongoing : 3

### **Other Institutional Responsibilities**

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1. Currently acting as student Advisor/faculty mentor to 20 Undergraduate students.
2. Currently Chairman of committee to monitor “Prevention of Caste-based Discrimination in Higher Education Institutions” at College of Agriculture, Vellayani campus.
3. Internal Complaint Committee -Chairperson
4. Student advisory services-B, Sc. (Hons.) Ag.
5. MOOC – online course on Apiculture as course co-ordinator

### **Membership in Professional Associations**

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1. Principal member of Apiary Industry Sectional Committee (FAD3), Food and Agriculture Department, Bureau of Indian Standards
2. Association for Advancement of Entomology
3. Federation of Indigenous Apiculturists
4. Editorial committee of Theneecha karshakan
5. Expert panel member in the Honey Mission Project of KVIC