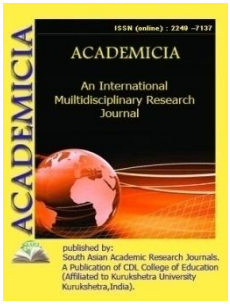
ACADEMICIA

ISSN: 2249-7137 Vol. 11, Issue 10, October 2021 Impact Factor: SJIF 2021 = 7.492

ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)



DOI: 10.5958/2249-7137.2021.02222.9

THE DEVELOPMENT OF INSECT FARMING

Dr Pramod Kumar*

*Sanskriti University,
Mathura, Uttar Pradesh, INDIA
Email id: farm.agri@sanskriti.edu.in

ABSTRACT

Agriculture has developed separately in three insect orders: once in ants, once in termites, and seven times in ambrosia beetles. Agriculture has evolved independently in three insect orders. Despite the fact that these insect farmers are very distinct from one another in certain respects, they are surprisingly similar in many other aspects, which suggests that they have evolved via convergent evolution. All of them reproduce their cultivars as clonal monocultures inside their nests, and in the majority of instances, they propagate them clonally over several farmer generations as well. Despite the fact that long-term clonal monoculture presents unique challenges for disease control, insect farmers have developed a variety of strategies to manage crop diseases: they (a) isolate their gardens from the surrounding environment; (b) monitor gardens closely, controlling pathogens as soon as disease outbreaks occur; and (c) occasionally access population-level reservoirs of genetically variable cultivars, even while maintaining their own gardens. Rather of cultivating a single cultivar purely for nutrition, it seems that insect farmers produce, and potentially "artificially select" for, integrated crop-microbe consortia, which are then distributed across the field. It is possible that crop domestication occurred in the setting of coevolving microbial consortia, which may account for the agricultural success of insect farmers that has been documented for 50 million years.

KEYWORDS: *Agriculture, Evolution, Insects, Microorganism, Termites.*

REFERENCES

1. J. D. Evans *et al.*, "The i5K initiative: Advancing arthropod genomics for knowledge, human health, agriculture, and the environment," *Journal of Heredity*. 2013, doi: 10.1093/jhered/est050.

2. E. Crotti *et al.*, "Microbial symbionts: A resource for the management of insect-related problems," *Microbial Biotechnology*. 2012, doi: 10.1111/j.1751-7915.2011.00312.x.

3. A. Papanicolaou *et al.*, "The whole genome sequence of the Mediterranean fruit fly, Ceratitis capitata (Wiedemann), reveals insights into the biology and adaptive evolution of a highly invasive pest species," *Genome Biol.*, 2016, doi: 10.1186/s13059-016-1049-2.

4. D. Vanderpool, R. R. Bracewell, and J. P. McCutcheon, "Know your farmer: Ancient origins and multiple independent domestications of ambrosia beetle fungal cultivars," *Mol. Ecol.*, 2018, doi: 10.1111/mec.14394.

5. J. Gowdy and L. Krall, "The economic origins of ultrasociality," *Behavioral and Brain Sciences*. 2015, doi: 10.1017/S0140525X1500059X.

6. A. van der Meij, S. F. Worsley, M. I. Hutchings, and G. P. van Wezel, "Chemical ecology of antibiotic production by actinomycetes," *FEMS Microbiology Reviews*. 2017, doi: 10.1093/femsre/fux005.

7. F. O. Aylward *et al.*, "Convergent bacterial microbiotas in the fungal agricultural systems of insects," *MBio*, 2014, doi: 10.1128/mBio.02077-14.

8. A. R. I. Lindsey *et al.*, "Comparative genomics of the miniature wasp and pest control agent Trichogramma pretiosum," *BMC Biol.*, 2018, doi: 10.1186/s12915-018-0520-9.

9. L. M. Boykin, C. D. Bell, G. Evans, I. Small, and P. J. De Barro, "Is agriculture driving the diversification of the Bemisia tabaci species complex (Hemiptera: Sternorrhyncha: Aleyrodidae)?: Dating, diversification and biogeographic evidence revealed," *BMC Evol. Biol.*, 2013, doi: 10.1186/1471-2148-13-228.

10. C. J. Jackson *et al.*, "Structure and function of an insect α-carboxylesterase (αesterase7) associated with insecticide resistance," *Proc. Natl. Acad. Sci. U. S. A.*, 2013, doi: 10.1073/pnas.1304097110.